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5. Indigenous Palms of Trinidad and Tobago

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143. MAURITIA SETIGERA, ponderous tree of Trinidad, about 60 feet and more tall, with heavy palmate leaves and loricate nuts.

L. H. Bailey
1-2-45

ARTICLE 5.
INDIGENOUS PALMS OF TRINIDAD AND TOBAGO.

Two or three years ago I was asked by members of services of Trinidad and Tobago in the farther British West Indies to prepare a list of the species of palms native on those islands. This assignment I was the more ready to accept, inasmuch as it was on Trinidad that I first began the collecting, photographing and studying of palms now more than one-third of a century ago. In the meantime I had visited the island a number of times and the territory was familiar. In the new assignment I have visited the island again more than once or twice, and my orbit has also covered Tobago. It is an attractive territory to the student of palms, and the flora is rich in species of them.

The standard treatment of these palms is by A. H. R. Grisebach, aided by Hermann Wendland, in his Flora of the British West Indian Islands in 1864. In the meantime certain good lists have been published but no monographic treatment. First break-away on Trinidad from that excellent Flora was by N. L. Britton in 1923 with the publication of *Bactris savannarum*. That species was collected by Britton and W. G. Freeman in 1920, again by Britton, Broadway and Bailey in 1921, by Broadway again in 1922, by Bailey again in 1946, and is now well known. Since that period it has been my privilege to see the palms of Trinidad rather extensively; the International Rules of Nomenclature are now universally applied; completer specimens and many photographs have been assembled; a more comprehending spirit has come into taxonomy; therefore this Fascicle on the palms of Trinidad and Tobago presents a new face to an old problem.

Trinidad is a meeting place of travel. Plants have come to it from around the world. Amongst these plants are abundant palms. These introduced palms are not included in this treatment, not even the coconut, *Cocos nucifera*, which is ubiquitous in tropics. Neither is the peach palm or pejibaye, *Guilielma Gasipaes* (*G. speciosa*) included; one sees it about cabins across the island and now and then it appears to be semi-spontaneous; it is apparently an introduction from the South American mainland, but this question as well as the taxonomy of the Costa Rican species must await a separate study. This Guilielma is prized in Trinidad, as well as elsewhere, for its edible fruits; by the natives I have heard it called *piliwa* and *piwa*.

Of course a report of this character is not spontaneous. Cordial aid has been rendered by many persons, particularly in the Forest Service of

Trinidad, specially in the persons of R. L. Brooks then Conservator of Forests for Trinidad and Tobago, who in 1938 supplied me an excellent annotated list of the palms of these islands prepared by C. Swabey former Assistant Conservator of Forests in Trinidad, John Cater, Senior Assistant Conservator of Forests, Dr. John S. Beard, then in the West Indian Forest Service, J. C. Millar. In former days I went with the late W. E. Broadway of the Department of Agriculture in Trinidad, a ready vigorous collector and tireless scout, as well as with W. G. Freeman, then Director of Agriculture, now returned to England.

The citation of localities for the different species in this Fascicle are of those places from which I have specimens or which represent standard authorities. These records are not intended to indicate the range of the species on Trinidad and Tobago, or the nature of their occurrence; that is a problem to be worked out by local students and collectors not only in reference to distribution but in association with soils, elevation, geological history, and relation to other vegetation. Now that the species are better known and recorded, it is possible and attractive to make dependable ecological and forestral studies. It is to be noted, also, that probably not all the palms of these two islands are yet discovered; the new acquisitions will undoubtedly develop in the regular course of the insular work.

It is not improbable that some of the palms now considered to be endemic to Trinidad-Tobago may be native also on the contiguous South American mainland, but these relationships cannot be determined yet. Even if we had type specimens of the presumably similar continental species we should not expect to be able completely to clarify the subject because of the inadequacy of specimens; and the original descriptions are often as faulty as the materials. Only when we have identified those species in nature and have collected materials and photographs comparable with those available on Trinidad can we discuss identities, and this is long years in the future. When sufficient collections are at last available we may not be able even to identify old fragments and descriptions with living plants; and the question may then arise whether some of these names should not be discarded as *nomina incerta*.

Studies of these palms in the field have notably disclosed the inadequacy and even the inaccuracy of our former comprehension of them, and challenges much of the tradition. We begin to understand that distributions of palms follow certain rather definite regions and that we can no longer infer that an insular species is the same as a contiguous continental species or that all the islands of the West Indian chain support the same species. Apparently there are many endemics. In the present study, the palm floras of other islands have been taken into consideration, literatures have been consulted, and I have again visited Venezuela and British Guiana as well as coastal parts of Dutch Guiana and French Guiana, and to the Amazon.

All these studies and collections require a further forthcoming Fascicle on the palms of these other regions; and my successors by studies of their own may be able to arrive at dependable conclusions on palm distribution.

We are not yet ready for such dependable conclusions on palm distribution in the western hemisphere. More contemporaneous taxonomic studies are required, particularly on the mainlands. The old practice of founding species on bits of pieces should pass away. The kinds of palms, their species, their habitats, the reasons why, is a new field for exhilarating study.

We are slowly learning that species of palms have geographies and localities. This fact will soon modify our procedure in taxonomy.

KEY TO PALM GENERA OF TRINIDAD-TOBAGO

A. Leaves palmate or fan-shaped, unarmed unless rarely by thin setæ or hair-like bristles.

B. Flowers unisexual, plant dicœcious: fruit large, about 4–5 cm. long or broad, the exterior brown and loricate: leaves palmatifid to base, segments mostly narrow and stiff, midrib not continued through blade, petiole cylindric in its upper part.....1. MAURITIA, page 357

BB. Flowers bisexual: fruit small, 1 cm. or less long or broad, with plain exterior: leaf-segments broad and flat, commonly not extending to base of blade, petiole flat and 2-edged.

C. Blade costapalmate, the petiole continued beyond the large triangular hastula as a midrib nearly or quite through the blade, and the leaf with a downward central curve: albumen plain.....2. SABAL, page 360

CC. Blade of leaf flat, without a continuing rib, hastula an upstanding lip-like body: albumen strongly ruminate.....3. COCCOTHRINAX, page 362

AA. Leaves pinnate or feather-like or plumose, or if the blade undivided then pinnately veined from a midrib.

B. Palms armed on trunk or leaves or spathe or throughout with prickles, spines or thorns.

C. Plant climbing or clambering by means of spine-hooks representing pinnæ on the upper part of long slender whips, not self-supporting.....4. DESMONCUS, page 367

CC. Plant erect, not climbing, pinnæ not developed into hooks.

D. Trees small, bole mostly less than 8–12 cm. diam., commonly three or more trunks growing together and often coloniate or gregarious: cymba or permanent spathe short and often nearly as broad as long when fully expanded: staminate flowers not sunken in rachis.

E. Fruits small and hard, not edible: trunks thin and slender, not always tree-like: pinnæ mostly relatively short and broad and not slenderly acuminate, prevailingly standing in one plane.....5. BACTRIS, page 376

EE. Fruits highly colored and fleshy, agreeably edible: pinnæ long, linear, slenderly acuminate and standing in more than one plane on rachis.....GUILIELMA (introduced)

DD. Trees of good forest size, growing singly, bole commonly 30 cm. or more diam. at maturity: cymba 1 m. or more long, woody: staminate flowers sunken in rachis.

EE. Fruit globular to oblate, often broader than long, about 3.5 cm. thick, beak and cupule short or not elongated, exterior smooth and glossy: trunk usually tumid. . . 6. ACROCOMIA, page 402

EE. Fruit ovoid to obovoid, body about 5 cm. long and 4 cm. thick, beak and cupule long and prominent, surface dull and rough: trunk not tumid. . . . . 7. ASTROCARYUM, page 406

BB. Palms unarmed with prickles, spines or thorns (partial exception in young plants of no. 9).

C. Mature fruits large, hard and loricate or tessellate, 4–5 cm. thick: spathe a woven cloth-like soft sheath that tears open irregularly at maturity: leaves on the pinnate order but the divisions or pinnæ irregular in size, width and conformation; petioles thick and nearly or quite cylindric. . . . . 8. MANICARIA, page 409

CC. Mature fruits wholly otherwise, not loricate or tessellate or tuberculate, the exterior smooth: petioles flat and 2-edged.

D. Fruits without soft or edible or liquid parts: trunks (when present) erect and straight.

E. Trunk or bole very short or sometimes nearly lacking, slender, cane-like and jointed, plant spineless unless perhaps a few deciduous prickles on margins of young leaves: spadices simple or essentially so, infrafoliar. . . . . 9. YUYBA, page 413

EE. Trunk well developed, plant a tree or tree-like and spineless in all parts: spadices infrafoliar in numbers 10 and 11, otherwise interfoliar.

F. Spadices standing well below the coma or head of foliage, the crownshaft well developed.

G. Tree with slender trunk swayed in the wind, of medium height; crownshaft short but evident, perhaps not usually exceeding 1 m.: cymba or spathe not woody or long-hanging: rachillæ of spadix rough or irregular, often with pits holding the flowers: petals of staminate flowers free, not united: albumen often ruminate. . . . . 10. EUTERPE, page 417

GG. Tree with rigid very straight trunk reaching great heights to 25–30 m. or more; crownshaft very prominent, often 2 m. or more long: cymba very long, woody, hanging after flowering: rachillæ of spadix very slender and not rough, flowers superficial: petals of staminate flowers united at base: albumen not ruminate. . . . . 11. ROYSTONEA, page 430

FF. Spadices interfoliar, borne among the foliage in the coma or crown, or if apparently infrafoliar (as in some Geonomas) only because the leaves have fallen.

G. Foliage irregularly or imperfectly pinnate, the pinnæ or divisions of different widths and sizes, or the blade pinnatisect or entire with erose or lobed apex. . . . . 12. GEONOMA, page 432

GG. Foliage regularly pinnate, trees mostly large, often ponderous.

H. Shape of fruit of the globular type, not exceeding 10–12 mm. thick when dry; albumen strongly ruminate: rachis of inflorescence continuous. . . . . 13. PRESTOEA, page 434

HH. Shape of fruit on the oblong or ovoid order, much longer than broad, length when dry 3 cm. and more; cupule and beak prominent.

II. Albumen ruminate.....14. JESSENIA, page 435

II. Albumen plane, solid.

JJ. Petals minute or perhaps not distinguishable: stamens 6, much exserted: fruit 1-seeded.....15. MAXIMILIANA, page 437

JJ. Petals elongate and narrow, exceeding the 6 stamens: fruit sometimes 3-seeded.....16. SCHEELEA, page 441

DD. Fruits very large, containing extensive edible peripheral albumen that holds drinkable liquid: trunk inclined or crooked unless in close plantations.....Cocos (introduced)

Drawings for illustrations in this Fascicle are by Miss Marion E. Ruff; photographs by the author.

The dagger (†) indicates a new name.

1. MAURITIA—MORICHE PALMS

Genus Mauritia begins with the younger Linnæus in 1781 with one species, *M. flexuosa*, of Brazil where it is known as Miriti, but now ascribed also to other parts of South America. The genus was named in honor of Johan Maurits von Nassau, 1604–1679, once governor of the Netherlands West India Company in Brazil.

Alfred Russel Wallace writes of *Mauritia flexuosa* in his Palm Trees of the Amazon, 1853, page 50: "The Miriti is a social palm, covering large tracts of tide-flooded lands on the Lower Amazon. In these places there is no underwood to break the view among interminable ranges of huge columnar stems rising undisturbed by branch or leaf to the height of eighty or a hundred feet,—a vast natural temple which does not yield in grandeur and sublimity to those of Palmyra or Athens."

About sixteen species of Mauritia are now recognized, all native in South America except the single one on Trinidad. There has been question whether the Trinidad species is the same as the continental *M. flexuosa*. I contrast the oblong fruit of *M. flexuosa* in Brazil as pictured by Martius and Wallace (Fig. 146) with the nearly globular ripe fruit of *M. setigera* of Trinidad (Fig. 144), the one longer than broad, the other broader than long. There are other differences between the species.

MAURITIA, Linn. f. Sp. Pl. Suppl. 79 (1781).

Major mostly columnar trees with palmate leaves and heavy interfoliar flower-clusters not exceeding the foliage, fruits hard, 6–7 cm. or less long and broad with loricate exterior, cupule small and often inconspicuous: dicœcious or perhaps imperfectly polygamous: spadix branched, the branchlets or rachillæ issuing from sheathing bracts in distichous arrangement

and at length drooping, main or general spathe inconspicuous or undeveloped, the spathelets loose short sheaths surrounding the axis and more or less pointed on one side; staminate flowers many in short salix-like projecting catkins; pistillate flowers 2–4 in a bud-like little spadix shortly projecting from the sheathing spathelet; calyx a 3-pointed cup from which the 3 long petals project; stamens 6, with prominent anthers; pistillate flower with stout pistil topped by 3 nearly or quite sessile stigmas: fruit a globose or ovoid or ellipsoid hard 1-seeded body size of a walnut with plain albumen and a smooth loricate brown exterior, subbasal embryo and long raphe: leaves fan-shaped but not costapalmate, divisions extending nearly to base and disposed separately as they hang, petiole nearly cylindric, not edged or dentate, hastula little developed.

Mauritia setigera, Grisebach & Wendl., Fl. Brit. W. Ind. 515 (1864). Figs. 143–145.

M. flexuosa trinitensis, Martius ex Grisebach, l.c.

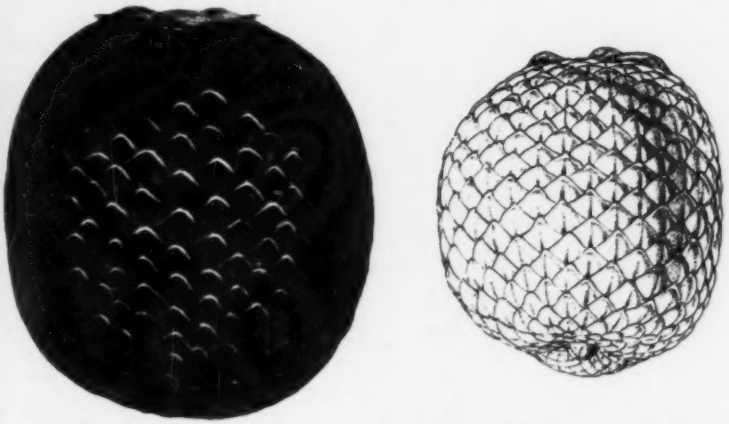
Erect to 30 m. and perhaps more, bole straight and cylindric and marked by circular rings of scars: coma at maturity of 12–20 great divaricating living leaves with long prominent petioles and deeply divided blades with curving-hanging narrow segments and several long-hanging dead

144. Nuts, and seed at top, of *Mauritia setigera*, broader than long, outer shell beginning to break and fragment of shell at upper left; note the small fruiting calyx.

145. SECTION OF SEED, somewhat enlarged, of *Mauritia setigera*; embryo at base right.

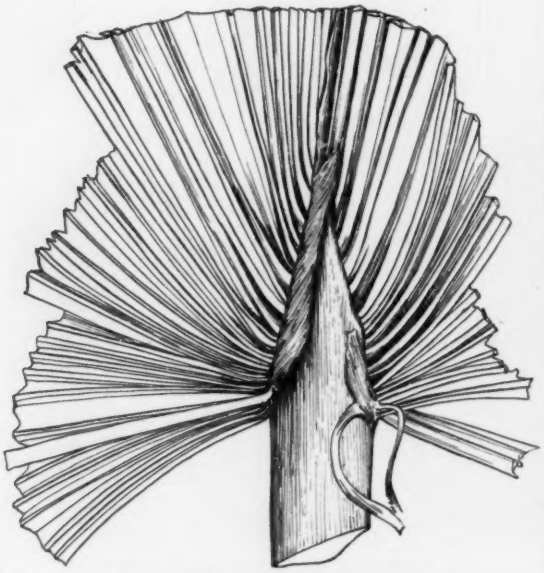
leaves: petiole expanded toward base but cylindric and not grooved in its terminal half, heavy and strong, 2–4 m. long; segments 1–2 m. long, 4–5 cm. or more broad near middle, tapering to long narrow point, margins smooth, strongly midribbed and bearing many lesser lateral veins, surface glabrous throughout: spadices several to each tree, the fertile ones hanging nearly the length of the dead leaves and bearing a great elongated cluster of fruit that may weigh 100 pounds and reach 12 dm. long; dead stalks or rachillæ of either sex zigzag and bearing the wide-open cups or spathelets where the clusters of flowers were borne: fruit nearly globose, glossy brown, about 5 cm. broad and 4–4.5 cm. long, closely loricate, apical point 3–5 mm. long, cupule broadly expanded, the 3 exterior obtuse parts 1 cm. or somewhat more long from the basal separation; the thin parchment-like exterior inclosing a soft mesh-like material inside which is the hard oblong nut 3–4 cm. long pointed with the long raphe, interior a white flinty dry homogeneous content with the embryo about 4 mm. long imbedded at one side toward the base, its location being marked by an external depression.

A noble palm in grassy savannas and low bushy areas, commonly in clumps or colonies, in several parts of Trinidad, as in the Arena area, Aripo, Nariva swamp, near the Pitch Lake. It forms according to Grisebach "the chief vegetation in the swampy parts of the island."



146. NUTS OF MAURITIA FLEXUOSA of the Amazon, for comparison, longer than broad. At left, somewhat enlarged from Martius; at right, natural size from Wallace.

To Grisebach and Wendland the fruit of this palm was unknown, and I am not aware of any description of it. The name *setigera* means seta-bearing: Grisebach states that the midrib of the leaf is distantly prickly above "with incurved weak (4 lines long) bristles" and this character distinguishes the species from *M. vinifera* and *M. flexuosa*. I have examined many leaves of trees of the Trinidad Moriche and have not seen any setæ. This non-conformity with the Grisebach account, and the fact that the fruits were unknown to him although abundant and conspicuous in nature, leads me to wonder what palm he had in mind. There appear to be no specimens extant of the Grisebach-Wendland material. One dislikes to continue the name *setigera* for a non-setigerous plant; yet the case is still open for investigation as to whether there is variation in this character or perhaps two species involved, or whether the authors had in hand another palm from another region. We have plenty of species-names that are not applicable, and unless further evidence develops I shall not change the name of this Mauritia.



147. HASTULA of *Sabal glaucescens*. × ½.

2. SABAL—THE PALMETTOES

The species of Sabal are twenty-six as now understood (see Bailey, Gent. Herb. vi, fasc. vii, 1944). They are all American. The generic name Sabal begins with Adanson in 1763, the meaning of the word unexplained. The taxonomy of the genus has been confused in all the subsequent years because botanical specimens in the herbaria have been inadequate,

nature of the plants as they grow has received little attention, and the species are scattered in such disconnected places that comparisons by a single person have not been made. Thus it comes that old binomials have been loosely and inaccurately applied. Only one species has been recognized on Trinidad.

SABAL, Adanson, Fam. Pl. ii, 495 (1763).

Mostly tall and columnar trees but sometimes nearly or quite acaulescent and bush-like, with fan-shaped costapalmate leaves and flowers in branching interfoliar spadices: flowers very many, bisexual; calyx tubular, 3-toothed, petals 3 and usually separate from each other, stamens 6 with large terminal anthers, pistil 1 and central of 3 carpels only one of which commonly develops: fruit a small dry nearly or quite globose 1-seeded body containing an ascending narrow embryo in upper part or lateral, albumen plain: leaves with petiole flat on upper face, 2-edged and lacking teeth, projecting into blade with a triangular prominent hastula, continuous as a midrib, the blade as it hangs with a strong downward curve or twist.

Sabal glaucescens, Lodd. ex Martius, Hist. Nat. Palm. iii, 320 (1850); Bailey, Gent. Herb. vi, 396 (1944). CARAT. Figs. 147, 148; see also the tree in Fig. 206, Gent. Herb. vi.

Tall slender palm known in Trinidad as Carat, to 15 m. and more tall, often conspicuous in coastal bush, and standing against the sky over second-growth and cut-over lands, boles not always strictly erect, coma or head loose and open with perhaps 20 and more spreading deeply divided leaves and the lower ones hanging: flowers on slender side-branching spadices that equal or exceed the leaves and may be 3 m. long; flowers about 4 mm. long, basal calyx-cup prominent, 3 narrow petals widely spreading at full anthesis, 6 stamens overtopping the erect single pistil: fruit pyriform or narrowed to base, black, 8–12 mm. thick either way: hastula triangular, 3–8 cm. long, pointed, sides infolded; palman small (about .5 m. across or long), the leaf deeply parted, segments 5–7 cm. broad at base.

148. RIPE FRUITS of *Sabal glaucescens*, natural size.

Said to be generally distributed on Trinidad. I collected it recently at and near Quinam Bay in St. Patrick. The leaves are much used as thatch. It has been listed as *S. mauritiæformis* but that species is Colombian.

3. COCCOTHRINAX—LATANIER

Coccothrinax was separated from Thrinax in 1899 by the late Charles Sprague Sargent, eminent North American botanist and forester, because of ruminate albumen in black fruits rather than plain albumen in white fruits as well as by other distinguishing characters. The separation is botanically sound and is universally accepted. The species of Coccothrinax are not yet understood. The Florida relationship was discussed by myself in 1939 (Gent. Herb. iv, fasc. vi) and the species of the Greater Antilles aside from Cuba in fascicle vii. Nine species are covered. León recognizes fourteen species and several varieties in Cuba. We are now to determine what species occurs in Trinidad-Tobago.

From the Virgin Islands, both British and American, south to Trinidad the herbarium collections of Coccothrinax are insufficient for careful study. Some of the islands are not represented. Therefore, on this occasion, I shall attempt description of only one species, although I think I recognize other undescribed species in the territory, and to them I hope to return. On Trinidad, as on Barbados and elsewhere, one sees a large Coccothrinax-like palm about grounds and parks; I have never seen it as if spontaneous. It is a handsome species with leaf-blades only slightly lighter in color underneath, attractive hanging segments, and a broad short not very prominent hastula. The fruits are white and albumen plain. It is a Thrinax, probably *T. excelsa*, known positively only in cultivation but probably native in Jamaica as stated by Grisebach. It is likely to be called *Thrinax barbadensis*, but that is an unidentifiable name (see Bailey, Gent. Herb. iv, 139, 149, 1938).

We do not know a Thrinax native on Trinidad or Tobago. This statement brings up the question of *Thrinax radiata*, Lodd., assigned by Grisebach and others to Trinidad. This is an horticultural binomial, bestowed by Loddiges, British nurseryman, on an undescribed plant of uncertain nativity, presumably grown in a pot or tub in England. He invented a name but did not found a species. In the days before the International Botanical Congress, 1905, it was the obligation of taxonomists to retain all names and try to account for them. Since 1905 we follow the "type method," by which we depend on the original author's type specimen for concept of the species, or in the absence of a specimen on corroborative evidence. Now an unidentifiable name is discarded. Workers in the present

day, following practices of great accuracy, would have considered the Loddiges binomial as a *nomen nudum* and would have deleted it. That obligation still holds, in spite of the intermediate effort to verify it, each new author giving his own interpretation of the situation. Several authors took it up in the last century. Martius, in 1837, took up the name *T.*

149. COCCOTHRINAX AUSTRALIS, common on the coastal parts of Trinidad and Tobago: note inflorescence in lower part of head.

radiata with cursory description not including flowers or fruits and attributed the plant to various islands of the Antilles, as Cuba and Trinidad. Grisebach refers the species to Antigua as well as Trinidad. Sargent in 1899 when founding the genus Coccothrinax wrote (Bot. Gaz. xxvii, 89) that *Thrinax radiata* belongs in Coccothrinax but he did not (as stated) make a new combination under that genus: in 1901 Karl Schumann of Berlin attributed *Coccothrinax radiata* to Sargent, but the combination really belongs to himself (Just's Botanischer Jahresbericht, xxvii, pt. 1, 469). Beccari, the Italian author on palms, in 1907 (Webbia, ii, 288) places *T. radiata* as one of three doubtful or imperfectly known species of Thrinax and wonders whether the reference to Trinidad meant the island of that name or the place Trinidad in Cuba. Nobody knows what was intended by the name *Thrinax radiata*, and the name may be forgotten.

On the identity of *Coccothrinax argentea*, Sarg., now interpreted as Hispaniolan, see Bailey, Gentes Herbarum, iv, 251 (1939).

COCCOTHRINAX, Sarg. in Bot. Gaz. xxvii, 87 (1899).

Thrincoma, O. F. Cook, in Bull. Torr. Bot. Club, xxviii, 539 (1901).

Thringis, O. F. Cook, op. cit. 544.

Slender erect unarmed hermaphrodite trees of low or medium height, leaves fan-shaped but not costapalmate, the palman commonly comprising about one-half the blade, segments mostly upstanding but in some species

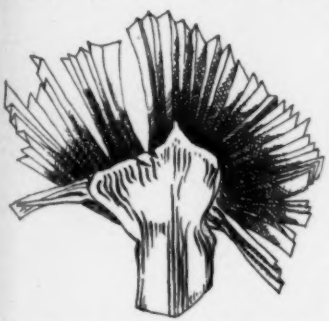
150. THE PALMATE LEAF of *Coccothrinax australis*.

drooping; petiole slender, flat on upper face, convex underneath, margins thin and sharp and entire; hastula an upstanding lip: flower-clusters interfoliar, often equalling or exceeding the leaves, with several branched open clusters from different nodes, the sheaths or spathelets little developed, flowers sessile or variously pedicellate; calyx and corolla cup-like; stamens 9; pistil single and simple: fruit a small body, dark brown or black or purplish at maturity, subglobose, usually less than 1 cm. thick, the flesh thin and soon hard; seed single, ribbed or furrowed to mark internal divisions, albumen strongly ruminate or divided into sections by intrusions from the walls, embryo lateral.

†**Coccothrinax australis,** spec. nov. Figs. 149-152.

Arbor, erecta, ad 15 vel 16 m. alta: folia 1–2 m. longa lataque, glabra, argentea subter; segmenta 3–5 cm. lata in medio vel basi, longo-acuminata, bifida, vulgo non pendentia; hastula curva et fere acuminata, circa 3 cm. lata: inflorescentia brevior quam folia, 5 vel 6 racemis pendentibus 15–20 cm. longis, spathillæ acuminatæ; flores circa 3 mm. longi in pedicello æque longo, pistillum stamina excedens, petala brevia acutaque: fructus globulares, 7–8 mm. crassi, cum maturi nigri vel atro-brunnei, non nitidi; semen 5–6 mm. latum, 4–5 mm. longum, complanatum, costis et depressionibus, albumen divisum vel ruminatum.

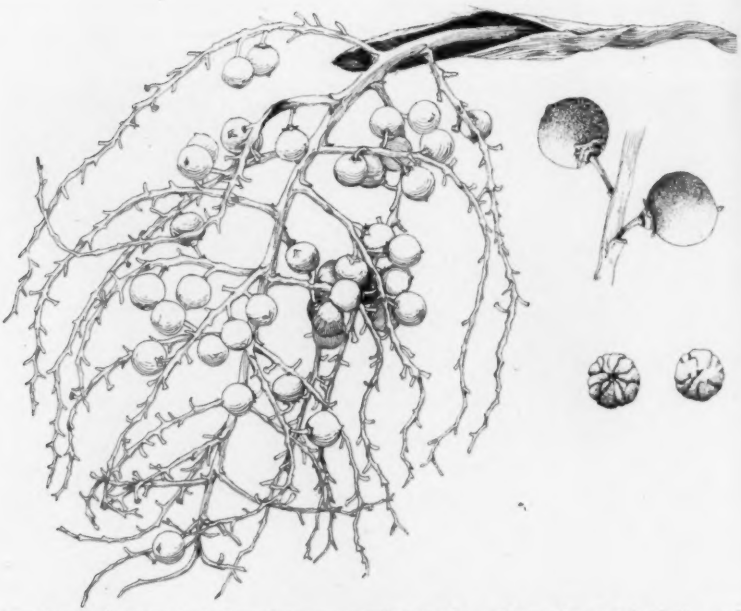
Rather stocky Latanier to 15 or 16 m. tall, heavily foliaged, trunk usually marked with rings of fallen leaves and some of the spent leaves usually hanging under the coma or head: petiole about 15 mm. broad at apex, obtusely ridged on upper face, rounded underneath; hastula a thick lip standing free of the blade, obtuse in outline but commonly developed to a point, length usually less than breadth, about 3 cm. across at base and 2–3 cm. high; leaf-blade 1–2 m. long, glabrous on both surfaces and prominently silvery underneath, split to about one-half its length into many long-acuminate slenderly bifid segments 3–5 cm. broad at middle or base, filaments none, segments mostly erect or outstanding but some of them more or less over-hanging: flower-clusters mostly not as long as leaves or not projecting beyond them, carrying 5 or 6 hanging clusters that are or become 15–20 cm. long, the free part of the pointed spathelets 3–6 cm. long; flowers scattered, about 3 mm. long on pedicel of equal or greater length, the single pistil with expanded stigma exceeding the spreading stamens and the stamens exceeding the briefly pointed petals: fruit globular, 7–8 mm. thick, with brief point, cupule lacking, green to whitish in color when nearly or quite full grown but becoming dull brownish-black; seed 5–6 mm. broad, width greater than height, marked by ribs and depressions, readily breaking under pressure into parts corresponding to the ruminate divisions.



151. HASTULA of *Coccothrinax australis*. × ½.

Trinidad, Tobago, Little Tobago, widespread on coastal hills, banks and cliffs. Trinidad: Quinam Bay, St. Patrick, *Bailey 118* (type); Palo Seco, St. Patrick, *Brittons & Hazen 1166*, *Britton 9749;* Manzanilla on east coast, *N. L. & E. G. Britton 2193;* Biscayne Bay, Monos Island, *Britton & Hazen 1739*. Tobago: point opposite Melville Islands to Charlotteville, *Freeman & Williams 11410* (collected 1925); Roxborough Bay, *J. S. Beard*. Little Tobago: *Bailey, Seifriz*. Goat Islands, Little Tobago, *Swabey 12951*. The species is variable, particularly in the pedicels and rachillæ which may be very slender when they have not borne a full crop of mature fruit. It is the southernmost Coccothrinax yet known, whence *australis*, southern.

This interesting Latanier, *Coccothrinax australis*, differs from *C. alta* of Puerto Rico in the much broader leaf-segments that are less acuminate-pointed than in that species, in its less slender petiole and its broad hastula inrolled from the sides and with a large upstanding central point, much larger and more developed spathelets, more slender and longer pedicels, brownish white-marked seeds, and in its more showy and striking foliage.



152. FRUITING PARTS of *Coccothrinax australis*. Spadix with spathe at left; fruits and seeds at right, about natural size.

4. DESMONCUS—CAMWELL PALMS, CLIMBING PICMOCS

Here we come to a fascinating problem, the clarification of our knowledge which is as intangled as the palms themselves that climb confusedly in thickets and on trees by means of their upper pinnæ developed into hooked spines or thorns and that hold the slender willowing stems far beyond reach. The genus Desmoncus (*bands* or *pairs of hooks*) was founded in 1824 by Martius to accommodate a few species of Brazil. Now more than sixty names are known in the genus, although Burret in the latest monograph, 1934 (Fedde, Repert. xxxvi, 197–221), accepts only forty-one tenable species, and lists many doubtful names. It will undoubtedly be many years yet before collections are adequate to enable us to understand the genus.

The name Atitara had been proposed for these palms in pre-Linnæan times and had been taken up by Jussieu in 1804 and adopted by Otto Kuntze in 1891, but the name was deleted by authority of the International Botanical Congress in 1906.

The confusion in Desmoncus is due to lack of keen observation in the field and to painfully inadequate herbarium collections. To recognize Camwell palms in the herbarium one must have good leaf specimens, hooks at the end of mature leaf, spathe, spadix, full-grown fruit. In addition one should possess evidence of the armature on stem or trunk, and flowers. More than one species may grow in an impenetrable tangle, and the collector is likely to get two or three things under one number.

This experience in Desmoncus supplements that of Bartlett in Central America and Mexico (Journ. Washington Acad. Sci. xxv, 81): "To secure specimens of the climbing palms takes much of a collector's time and effort, since they are often not found in fertile condition or easily secured even if found, because of their spininess and difficulty in disengaging them from the limbs of the trees through which they clamber. Good specimens are therefore disproportionately rare in our herbaria, in consideration of their importance in the composition of the tropical forest. Many of the described species are inadequately known, and it has become customary to use a few names as catch-alls for very distinct plants."

Burret divides the Desmonci into two subsections, depending on the nature of the terminal unci or hooks, but these hooks may differ strongly in their juvenile and mature form, and I am not adopting these divisions in publication of the species of Trinidad and Tobago. I prefer to divide on the shape and armature of the mature spathe, as indicated in the key herewith, Latispathæ and Cylindrispathæ.

One species of Desmoncus has been recorded on Trinidad-Tobago, *D. major*, and the problem has been assumed to be simple. Now we know the

problem is complex, and when we arrive at closer definitions we cannot apply the name *major* with exactness.

Another species, *Desmoncus horridus*, has been attributed to Trinidad and Tobago, probably in the faint suspicion that more than a single Climbing Picmoc is on those islands. This species was suggested by Splitgerber to Martius and published very briefly by the latter in 1845, as growing in woods in Surinam (Dutch Guiana); a small picture was shown of a pistillate flower (Hist. Nat. Palm. iii, t. 165 fig. A3). From that time *D. horridus* has been a floating name, attributed to many countries. At last I have good complete material of it from Surinam, pistillate flowers corresponding with the little cut in Martius, and I hope fully to define it for the first time in a forthcoming paper. I have seen nothing to match it on Trinidad-Tobago.

I have heard the Desmonci called "Gri-gri vines," probably from the similarity to "Gri-gri palms" or Bactris; also "Picmoc" palms, a name 84 (1824).

DESMONCUS, Martius, Palm. Fam. 20 (1824), Hist. Nat. Palm. ii, 84 (1824).

Unusual genus of climbing pinnate monœcious palms of perhaps 50 species in tropical America, a homogeneous group in which the sameness has obliterated the differences in the eyes of observers and yet with good characters of separation: trunk long and slender, the upper part standing aloft as if looking for support, commonly 2.5 cm. or less in thickness, variously armed: leaves long-pinnate, pinnæ mostly opposite but sometimes alternate or multiple, in 10–16 or more pairs or twins, several of the terminal pinnæ represented by spines which are at first weak and divaricate but which in most species become retrorse or even pointing straight backwards like hooks and are more or less swollen and woody at base; leaf-rachis and sometimes pinnæ bearing straight black spines: spathes and spadices axillary, the former spiniferous on outside and of two forms, the broad kind that become flat in press and are stiff-hairy, the narrow kind that are nearly or quite cylindric and bear rigid prickles with thickened base; spadix simple, comprised of several to many slender unarmed branches; flowers solitary, superficial, staminates ordinarily occupying the upper part of the rachillæ, stamens 6, pistillode sometimes present, calyx urceolate, minute; pistillates with 3-celled ovary and 3 stigmas, 1 cell or locule abortive: fruit small, nut-like, subglobose, ovoid or short-oblong, 15 mm. or less long, albumen homogeneous, pores 3, seed single.

A. Pinnæ (or at least the lower ones) very narrow and long, linear, about 1 cm. broad and 30 cm. long, unarmed unless on margin; prickles on leaf-rachis 1 cm. or less long: spathe 30 cm. long, covered with brown prickles that are less than 1 cm. long: hooks of terminal whip 2–7 or 8 cm. long. . . 1. *D. major*

AA. Pinnæ broader than linear and not greatly elongated, 2–3 cm. and more broad, armed or subtended by long slender prickles.

B. Spathe broad, 3–4 cm. or more, pressing flat, armed with hair-like prickles not bulbose at base.—LATISPATHÆ.

C. Prickles on mature spathe loosely placed or scattered, not touching each other, many or most of them without a white base, 6–10 mm.

long: terminal hooks somewhat diverging from each other, 2–3 cm. long: pinnæ opposite or subopposite, very broad, commonly 4 cm. or more, not long-attenuate.....2. *D. Hartii*

cc. Prickles on mature spathe close together or contiguous as if overlapping or touching each other, most or all of them with white base.

d. Terminal hooks very long, 5–6 cm., and flaring backwards, not with swollen base: pinnæ opposite or subopposite, narrow, 2–3 cm. broad, long-acuminate: fruit acute or tapered to apex. .....3. *D. Brittonii*

dd. Terminal hooks 3–4 cm. long, pointing straight backwards, with long swollen woody base: pinnæ opposite, broad, 4–6 cm., briefly acuminate: fruit rounded or blunt at apex except for a very brief sudden point.....4. *D. tobagonis*

bb. Spathe very narrow, fusiform or almost cylindric, stoutly armed with short bulbose-based stiff spinelets or prickles.—CYLINDRISPATHÆ.

c. Arrangement of pinnæ irregularly alternate; width of main pinnæ 2–3 cm. or less, being one-fourth or less of the length of the pinnæ: main stem or cane bearing slender prickles 2 cm. and less long, not broad-based: spines on spathe or most of them slender and hair-like.....5. *D. peraltus*

cc. Arrangement of pinnæ opposite; width of main pinnæ 4 cm. or more, being about one-half or one-third the length of the pinnæ: main stem or cane bearing short stiff spines with broad base: spines on spathe very short and broad-based, like real little thorns...6. *D. Prestoei*

1. **Desmoncus major,** Crueger ex Grisebach, Fl. Brit. W. Ind. 519 (1864).

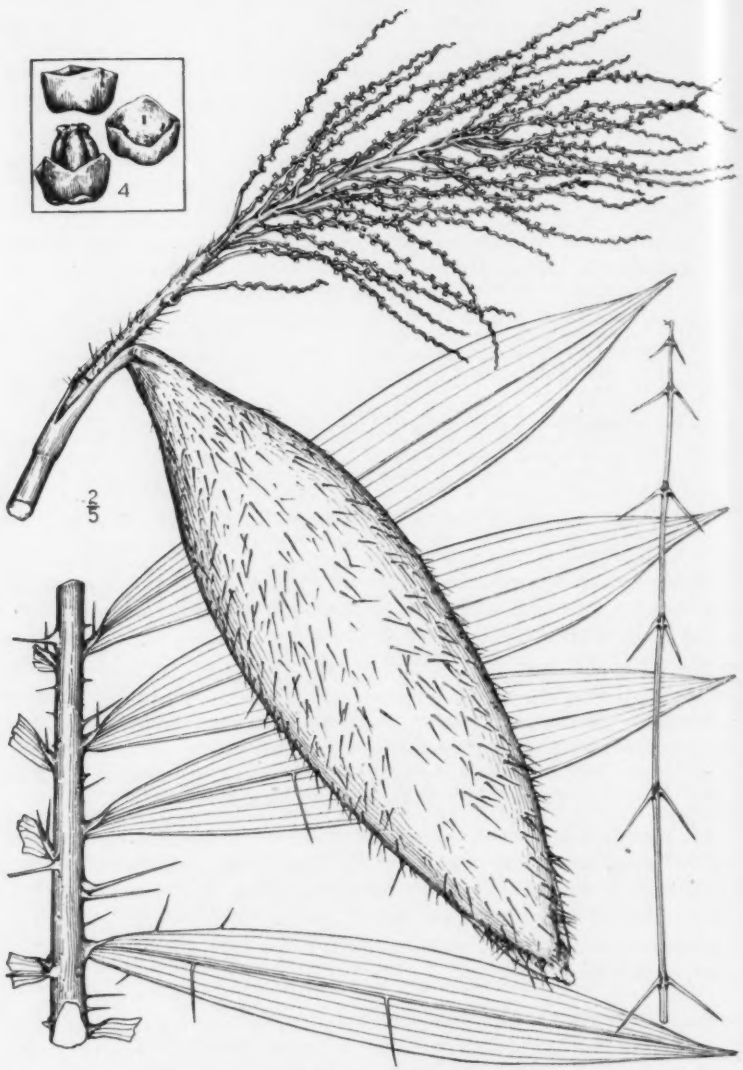
Unverified species described originally without fruits and with pinnæ only about 1 cm. broad, remainder of description not sufficient for identification in the field. It was collected at Caroni by Crueger, but has not been recognized there in recent time although search has been made. The species has been accepted heretofore inasmuch as only one Desmoncus was recorded on the island; now that we distinguish other species because of better collected materials we are in doubt what was meant by *D. major*. It has never been authentically figured. Burret in 1934 (Fedde, Repert. xxxvi, 205) refers *D. major* to *D. horridus* of Surinam.

As described in Grisebach the pinnæ are in 20 pairs, flattish, partly clustered, the inferior ones 1 m. long and 5 lines (1 cm.) broad, main pinnæ not defined, rachis prickly and covered with blackish deciduous tomentum, rachis subterete below and upper side flattish, prickles scattered, 6 lines or less long, hooks stout in 6 pairs and 1–3 inches long, spathe 1 foot long covered with brown prickles 3–4 lines long.

†2. **Desmoncus Hartii,** spec. nov. Fig. 153.

D. major, Auth.; Bailey, Gent. Herb. vi, 215, fig. 109 (1943), reproduced here as Fig. 153, not Crueger.

Vigorosus, magnus, scandens: pinnæ 5 vel 6 paribus, oppositæ vel subopositæ, latæ, non longo-attenuatæ, 15–20 cm. longæ et 4–6 cm. latæ, nudæ vel 3–5 spinis gracilibus, petiolus spinis longis, unci 5 vel 6 paribus,



153. DESMONCUS HARTII, one of the plants known as *D. major:* from Gentes Herbarum, vi, fig. 109; leafage, whip at right, broad spathe, spadix, pistillate flowers.

retrorsi et divergentes, 3–4 cm. longi: spatha 20–30 cm. longa, lata planaque, sparsis aculeis late dispersis 3–7 mm. longis sine crassa basi alba.

Vigorous major climber, glabrous except that the petiole and rachis may be more or less furfuraceous but soon becoming bare: pinnæ opposite or subopposite, broad, 15–20 cm. long and 4–6 cm. broad, narrowed to apex but not attenuate-acuminate, with several or many side-veins, nude or bearing 3–5 spines 2–4 cm. long near base and on rib, petiole and rachis carrying flattened spines 4–6 cm. long and intermediate smaller ones; cirrhous whip bearing 5 or 6 pairs of thick-based retrorse hooks about 3–4 cm. long: spathe or cymba 20–30 cm. long, flat and broad at maturity when pressed, the spines 3–7 mm. long and widely scattered so that they may be 5 mm. apart, the base scarcely thickened or white; flowers well separated, the pistillates 3–5 mm. apart and 2–3 mm. long: fruit ellipsoidal, nearly or quite 2 cm. long, one-half as thick, equally tapered both ways to a brief point, brown.

Trinidad, distribution not made out, probably general; Mayaro, *Bailey 619a* (type); Arena road, *Bailey 305;* Caroni, *Bailey 311;* Balandra Bay, *Brittons & Hazen;* Point Radix, *Swabey.* The species is dedicated to the memory of J. H. Hart, F.L.S., Superintendent of the Botanical Department, Port-of-Spain, author of Herbarium List, 1908; some of my material, "arranged by J. H. H." as *Desmoncus major*, is the species now under discussion.

†3. **Desmoncus Brittonii,** spec. nov. Fig. 154.

Gracilis, ad 10 m. altus: pinnæ 6–8 paribus, oppositæ vel subopposite, angustæ, 20–30 cm. longæ et 2–3 cm. latæ, anguste longo-acuminatæ, aculei 1–3 subtus, petiolus validis aculeis 3–6 cm. longis, unci maxime validi et basi lata, 5–6 cm. longi: spatha 30 cm. vel plus longa, lata et dense armata spinis ad 15 mm. longis fere basi alba crassaque: fructus ovoideo-oblongi, fastigati ad acumen, 17 mm. longi.

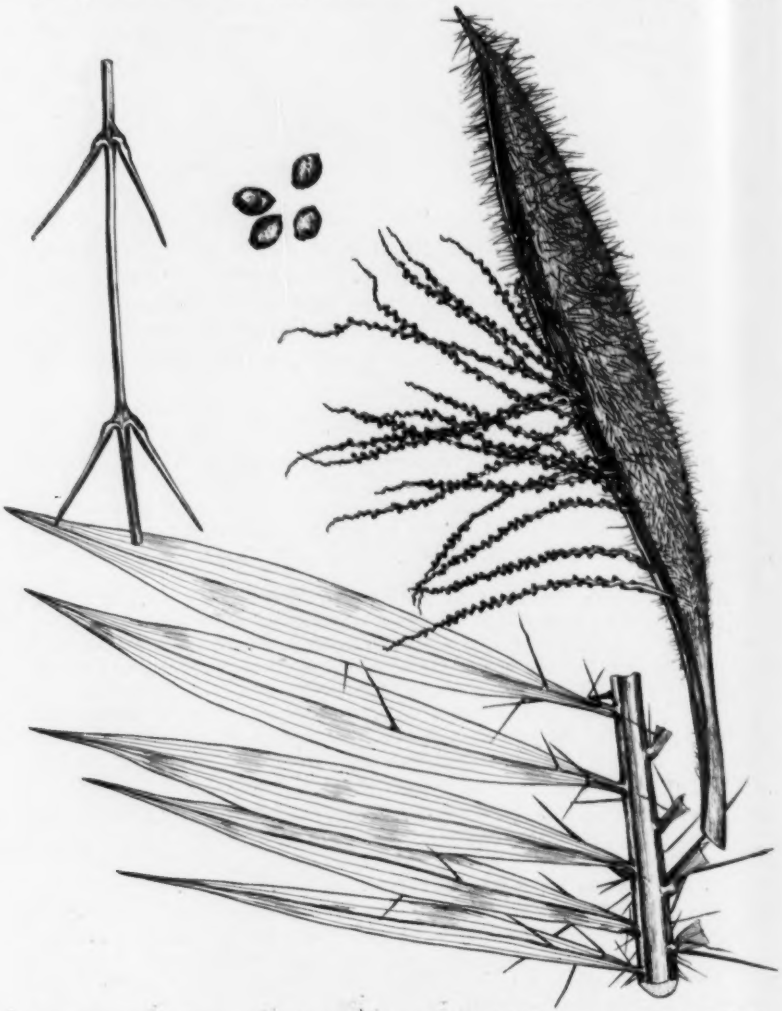
Slender tall plant to 10 m. long, glabrous unless furfuraceous on petiole and rachis: pinnæ opposite or subopposite, narrow, 20–30 cm. long by 2–3 cm. broad at middle, strongly side-nerved, narrowly long-acuminate, with 1–3 prickles on midrib underneath, petiole with stout prickles 3–6 cm. long; cirrhous whip bearing pairs of retrorse-divaricate broad-based hooks to 6 cm. long: spathe or cymba 30 cm. or more long, heavily armed with spines to 15 mm. long most of which have conspicuous thickened white base: dry fruit ovoid-oblong and tapering to point, 17 mm. long by 9 or 10 mm. thick.

Thicket at Pointe-a-Pierre, *N. L. Britton 1035* (1920); in thickets along Arena Road, *Bailey 172* (type).

†4. **Desmoncus tobagonis,** spec. nov. LATTAN. Fig. 155.

Maxime validus vigorosusque: pinnæ oppositæ, latæ, brevi-acutæ, 20–30 cm. longæ, 4–6 cm. latæ, nudæ vel 1 vel 2 spinis, petiolus rachisque spinis rigidis 4–6 cm. longis, unci 3–4 cm. longi, recte reversi: spatha 30 cm. vel plus longa, lata, plana, crasse obsita aculeis brevibus basi crassa albaque: fructus brevi-oblongi, 12 mm. longi, 6 vel 7 mm. lati, rotundati apice.

Stout and very vigorous climber, boles clustered together, the long leaf-sheaths densely covered with upward-pointing prickles of many lengths from 1 mm. to 2 or 3 cm.: pinnæ opposite or essentially so, broad and not elongated and point short, 4–6 cm. broad and 20–30 cm. long, many side-ribbed particularly underneath, either nude or bearing 1 or 2 stiff spines on rib or lower face, petiole and leaf-rachis carrying stiff strong spines



154. DESMONCUS BRITTONII; pinnæ, whip, spathe and inflorescence, fruits, all × ⅓.

4–6 cm. long; cirrhous whip long but stout and stiff, the hooks 3–4 cm. long, bent straight backward and with thick hard woody bases: spadix 15–20 cm. long, spathe to 30 cm. or more long and thickly covered with rather short prickles most of which have a conspicuous white base; flowers yellow and fragrant: fruit short-oblong, about 12 mm. long, 6 or 7 mm. thick, rounded or blunt at apex except for a very small short central point.

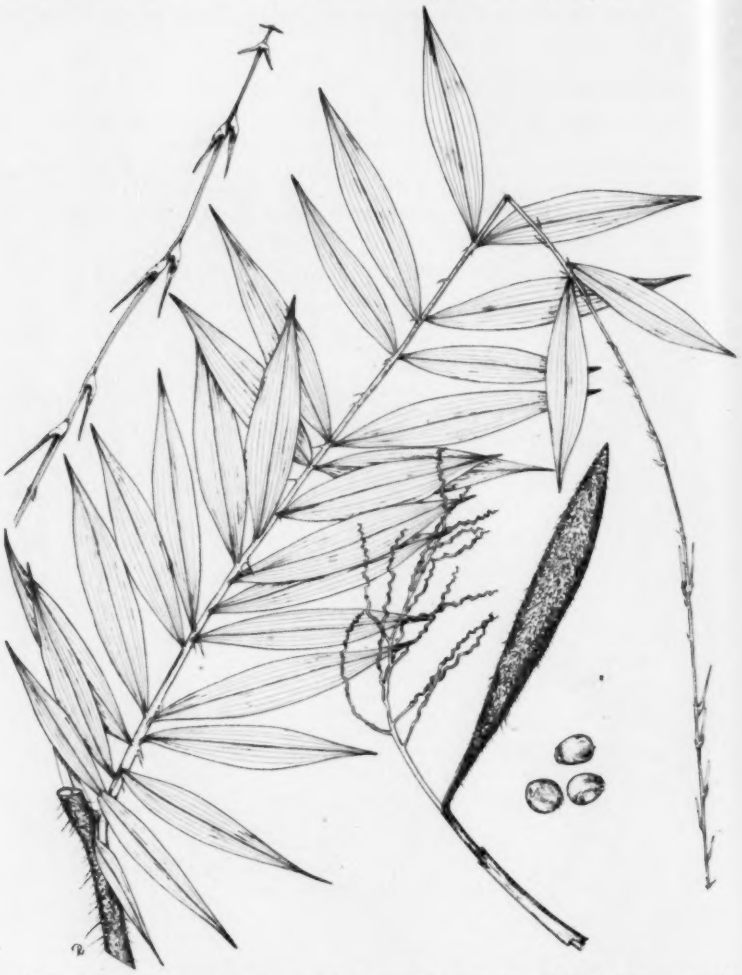
Tobago, at Mile End, *Broadway 4077*. A sheet collected at Rockley Vale, Tobago, *Broadway 3498*, may be this species although the pinnæ are narrow and the spathe small.

†5. **Desmoncus peraltus,** spec. nov. Fig. 156.

Gracilis, peraltus, ad 14 m.: pinnæ tenues, parvæ angustæque, fere alternatæ, 15 cm. longæ, 2–3 cm. latæ, longo-acuminatæ ad apicem basinque, unci fere oppositi, graciles, 2–3 cm. longi, unci breves in axe subtus: spatha longa angustaque, 20 cm. vel plus longa, pæne cylindrata sed 2–2.5 cm. lata cum aperta, obsita aculeis crassis sæpe basi alba: fructus globulares vel brevi-oblongi, 10–12 mm. longi, obtusi apice.

155. Desmoncus tobagonis of Tobago; foliage, whip (at right), spathe and spadix, fruit. × ⅓.

Slender but very tall (*peraltus*) glabrous climber, the long extensions often standing strongly upright to reach support, sometimes to 20 m., bole and leaf-sheaths with scattered short points or spines: pinnæ small and narrow, thin, glossy, prevailingly alternate, 15 cm. long by 2–3 cm. broad, long-acuminate into a very narrow point, narrowed also to base, finely many-nerved either side the midrib; cirrhous whip very slender, hooks perhaps opposite at apex but otherwise alternate, 2–3 cm. long and with



156. DESMONCUS PERALTUS; very slender, two whips (right and left), foliage, spathe and spadix, fruit. × ⅓.

157. DESMONCUS PRESTOEI, from Gentes Herbarum, vi, fig. 110; foliage, long whip, very narrow spathe, spadix, pistillate flowers.

non-morphological hooks below them on the rachis: spadix about 20 cm. long, rachillæ short, 10 cm. or less long; spathe long and narrow, 2–2.5 cm. broad when open and 20 cm. or more long, thickly covered with stiff broad-based and often white-based prickles 2–3 mm. long: fruit globular-oblong, 10–12 mm. long, obtuse at apex with very brief central point.

Arena, *Bailey 101* (type), making thickets 10–15 feet tall but ascending exploring shoots reaching two and three times that height; Cumuto, *Bailey 306*, in dense bush, shoots reaching to 60 feet in height.

6. **Desmoncus Prestoei,** Bailey, Gent. Herb. vi, 215, fig. 110 (1943), reproduced as Fig. 157.

Glabrous strong climber often with reddish stem; trunk and sheaths sparsely provided with stiff thick-based spines 3–5 mm. long and also very small setæ with now and then prickles 1–2 cm. long: pinnæ opposite or subopposite, unarmed, short and most of them broad, about 4–5 cm. broad and 15 cm. long but some of them one-half this width, acutely pointed but not narrowly acuminate, strongly side-veined, rachis bearing separated strong almost hook-like spines; cirrhous whip with many short hooks and ended by a few pairs of slender somewhat reversed spines 1–2 cm. long: spadix small, 10–20 or more cm. long, glabrous, rachillæ tortuous; spathe long and narrow, nearly cylindric, not much flattened when open, thickly covered with many short thick-based prickles 2–3 mm. long together with small stout protuberances; pistillate flowers 2–4 mm. apart and 2–3 mm. high, calyx-cup broad and shallow, corolla-cup more or less undulate on margin and containing a scarcely exserted stout columnar pistil: fruit large, ellipsoid-globular, about 18–20 mm. long and 15 mm. broad, the thin shell soon separating from the veiny seed.

Trinidad, on O'Meara savanna and at Matura; probably widely distributed. This is apparently the plant intended by the late Henry Prestoe as *D. minor*, a floating herbarium name that cannot be taken up under the Rules; we meet Henry Prestoe again in the genus Prestoea.

5. BACTRIS—GRI-GRI PALMS, ROSEAU PALMS

The vast occidental genus Bactris is indifferently understood. The viciously spiny character of most of the species apparently prevents them from being freely collected, yet this armature should stimulate an enterprising collector to master them. We have not given sufficient attention to the understanding of the Colombian species on which Jacquin founded the genus nearly two hundred years ago. More than 200 species are now described, but if we had the type specimens before us we probably could not make all of them out in terms of living plants.

Recent experience indicates that the species are probably mostly local

or at least regional, and suggests that we be cautious in trying to match up the species of one geography with old species of a different territory.

The collector of Bactris should obtain not only leaves but full fruit-clusters, flowers, spathes, section of trunk. If clear photographs can be taken, the gain to understanding of the species is greatly augmented. Note should be taken of height and whether the species is coloniate or gregarious and whether trunks in any case are single or several.

Twelve years ago I went to the Cartagena region of Colombia in the effort to discover the species of Bactris Jacquin had collected there in 1754–1759 and had published in Vienna in 1763 in his Selectarum Stirpium Americanarum. These species are two, *Bactris minor* and *B. major*, the former to be taken as type of the genus. *Bactris major* was separated by Karsten as type of his genus Pyrenoglyphis, a segregation I have not been able to accept for the reasons explained on page 224 of Gentes Herbarum vi (1943). I have felt well satisfied that I found the true *Bactris minor* of Jacquin, *habitat passim prope Carthagenam*, represented in Figs. 111, 112, 113, 114, 115 of the cited volume of Gentes Herbarum, the last picture repeated recently in 1946 as Fig. 51 of this volume. On that Colombian journey I also found *Bactris major* and figured the fruit-cluster in Gentes Herbarum, vi, Fig. 116. The fruits from that cluster are yet in my herbarium; now they are dried and shrivelled, and have much the shape of Jacquin's figure. In my account at that time, 1943, I recorded the distribution of *B. major* as then understood, including a statement that I had taken it on Trinidad but added that "I have been in doubt whether this insular palm is really the same species as the Cartaginian one." Now with more experience and much more material I have not been able as yet to recognize *B. major* on either Trinidad or Tobago; and I withhold judgment on distribution of the species beyond the coastal region of Caribbean Colombia.

The ubiquitous Gri-gris are notable forms of vegetation on Trinidad and in other tropics. They reach for the light on paths cut in woodlands, cover waste places, mark watercourses and shores of permanent ponds, support and inclose highways, fill swamps with comely verdure, make the undergrowth pinnate; and they are so formidable in spines that the population lets them alone. They preserve the investiture of the earth.

The genus Amylocarpus as founded by Barbosa-Rodriguez in 1902 and repeated in 1903 I now accept, and this accounts for the plant in Trinidad known heretofore as *Bactris simplicifrons*. This concept of Amylocarpus does not conform to Burret's acceptance of the group or to his reducing it to a subgenus of Bactris (Fedde, Repert. xxxiv, 170, 1933). I have redefined this Barbosan genus, but under the generic title Yuyba inasmuch as the name Amylocarpus is antedated.

The current monographic treatment of Bactris is by Max Burret in Fedde, Repertorium, xxxiv, 167–253 (Berlin, December 31, 1933).

BACTRIS, Jacq. Select. Stirp. Amer. Hist. i, 279, t. 171 fig. 1 (1763).
Augustinea, Karst. in Linnaea, xxviii, 395 (1856).
Pyrenoglyphis, Karst. Fl. Columb. ii, 141 (1866).

Small erect monœcious trees and large bushes prevailingly carrying many spines and prickles on boles, leaves and spathes, sometimes growing as a single trunk but often coloniate in extensive stands: leaves long-pinnate, often graceful and reassuring in habit and position: inflorescence interfoliar; main spathe boat-shaped at maturity and in expansion or sometimes remaining nearly cylindric, mostly not falling until fruits are dropped, dehiscing on one suture; spadix commonly simple, the short rachillæ from the apex of the peduncle or the peduncle sometimes continuous and rachillæ lateral; flowers typically in 3's but pistillates dominant on basal part of rachilla and staminates on upper part; stamens 6 or frequently 9 sometimes 12, pistillodium mostly not evident, ovary 3-loculed, staminodia sometimes discernible: fruit globose to ovoid, 1-seeded, exocarp mostly hard or soon drying, endocarp perhaps adherent to nut which bears 3 micropyles or pores; seed with homogeneous albumen, embryo opposite one of the pores. Species probably more than 200, all in western hemisphere.

AA. Mature dry fruit turbinate or top-shaped to nearly globular, about as broad as long, top truncate or nearly so, small, 2.5 cm. or less long and broad.

B. Spines on petiole distinctly flat and broad, 1–4 cm. long, conspicuously white or whitish: spathe thickly densely covered with hair-like prickles, neck of peduncle black-spiny: leaf-margins smooth: rachis of cluster continuous, rachillæ lateral: fruit very small and berry-like. ..... 1. *B. savannarum*

BB. Spines on petiole and elsewhere very slender, short or long, terete or essentially so, black or dark brown.

C. Rachis of the spadix not produced through the flower-cluster but only a short distance, the branchlets or rachillæ arising from or near the top of the peduncle and projecting forward: spines few and long: leaf-margins spinescent: spathe long and narrow, not densely armed: fruit 20–23 mm. broad..... 2. *B. Cruegeriana*

CC. Rachis of the spadix produced or continued through most of the length of the cluster, the branchlets or rachillæ rising from it at nearly right angles.

D. Petiole with spines clustered and blank spaces between the clusters, many of the spines 4–5 cm. long: neck of peduncle densely black spinose-hairy: fruit about 15 mm. thick.

E. Spathe thinly covered with short weak spines so that the surface is plainly visible, long and narrow: petiolar spines mostly not exceeding 3–4 cm. long: pinnæ not often exceeding 3 cm. broad, bearing very prominent whitish side ribs: fruit essentially truncate or flat on top with short point in center; cupule with lobed or undulate margin..... 3. *B. Cuesa*

EE. Spathe densely shaggy with long spines so that the surface is hardly visible, very long and narrow: petiolar spines often 4–5 cm. long: pinnæ not very prominently side-ribbed, sometimes 4–5 or 6 cm. broad: fruit somewhat tapered on top toward the central point; cupule with regular entire margin..... 4. *B. Sworderiana*

DD. Petiole with scattered spines usually not more than 2 cm. long: pinnæ thin, not white-ribbed, sometimes 5 cm. broad: spathe long and narrow, densely spinose: trunk with close concentric rings of many deflexed spines: fruit about 2 cm. broad and long. ..... 5. *B. circularis*

AA. Mature dry fruit for the most part large, 3–6 cm. long and commonly much narrower than that, elliptic, obovoid or ovoid, prominently beaked, cupule conspicuously double: rachis of spadix not extended through cluster.

B. Spines on spathe and elsewhere plain black or dark brown, not thickened and white at base.

C. Fruit nearly globular, about 3 x 4 cm., very briefly beaked, cupule of 2 very distinct biuntly lobed series: pinnæ narrow, prevailingly 3 cm. or less broad, strongly side-ribbed: some of the spines 5 cm. long: spathe small and narrow, densely black-prickly. ..... 6. *B. Broadwayi*

CC. Fruit elliptic or ovoid.

D. Length of fruit only 3–3.5 cm., ellipsoid, bluntly beaked: spathe broad at base, short, thickly densely armed; rachillæ after fructescence bearing many upstanding points: pinnæ narrow, setose on margins, some of the spines 5–6 cm. long... 7. *B. ellipsoidalis*

DD. Length of fruit 4 cm. or more, point large and notable, broad at base: rachillæ with an even surface or not with upstanding points: leaves mostly standing plane or flat (pinnæ not uprising): foliolar spines very short to about 2 cm. long, plain at bottom: spathe small and narrow, loosely armed... 8. *B. planifolia*

BB. Spines on spathe (or most of them and usually on trunk and petiole) conspicuously white-bulbose at base.

C. Pinnæ broad, mostly 2–3 cm. or more, flat, not rigid or stiff.

D. Shape of dry fruit obovoid, broadest above the middle, length nearly or quite 5 cm., inner ring of cupule twice longer than the outer: spathe sparsely armed, short and narrow: pinnæ very narrow, spinescent on margins: spines of many lengths, some of them as much as 6 cm. long..... 9. *B. obovoidea*

DD. Shape of fruit elliptic, ovoid or oblong.

E. Rachillæ of spadix rough with upstanding points after fruit falls: leaves more or less trough-like from the upstanding pinnæ: foliolar spines notably long and straight, many of them 4–6 cm., many or most of the spines with whitish bottom: spathe narrow, medium-sized, armed with spines up to 15 mm. long: fruit narrowed to base..... 10. *B. Cateri*

EE. Rachillæ of spadix lacking rough upstanding points after fruiting: foliolar spines for the most part 3–4 cm. or less long.

F. Fruit tapered to base: bole with widely separated clusters of ascending long spines below which is a broad white band surrounding the stem, internodal spaces bare: spathe short, small and narrow: fruit 5 cm. in length, long-tapering to apex, narrowed to base, about one-half as broad as long..... 11. *B. albonotata*

FF. Fruit broad at base, not tapered, nearly as broad as long. ..... 12. *B. beata*

CC. Pinnæ very narrow, most of them little if any exceeding 10–15 mm. broad, strongly ribbed and stiff: spathe loosely armed with slender spines: fruit long-tapered from near base..... 13. *B. Swabeyi*

1. **Bactris savannarum,** Britt. in Bull. Torr. Bot. Club, 1, 51 (1923). WHITE-SPINED or SAVANNA BACTRIS. Fig. 158.

Erect, 5–10 m. tall, several boles together, foliaged toward the top and becoming bare of sheaths toward base, 3–5 cm. thick, ringed with white bands; prickles on bole of various lengths, 1–5 cm. long, mostly in circles or intervals, light colored to nearly white, flat, mostly deflexed: leaves long-pinnate, ascending and outwardly curving, petiole angled and grooved and bearing prominent whitish flattened spines to nearly 5 cm. long and other weaker not flattened spines; leaflets alternate, sometimes clustered, unarmed or the younger ones short-prickly, variable in length and width, 30–50 cm. long and taper-pointed, 2–5 cm. broad, with several strong lengthwise nerves, margins smooth: spathe spindle-shaped, 20–25 cm. long and about 5 cm. thick, densely black-hairy and overlaid with thin spines 1 cm. more or less long, some of the spines whitish, those of the spathe bare, base narrowed into a finger-like part; spadix simple, with long curved flattened unarmed peduncle or handle, branches many, curved-divaricate, 12–15 cm. long; flowers well separated, about 4 mm. long, columnar, not sunken on rachis: fruit small, flattened endwise, about 8 mm. across, red or orange, somewhat striped lengthwise, calyx shallow with crenate margin.

Trinidad: savannas and the forest borders, Aripo, Cumuto, Long Stretch, several collectors: see page 353.

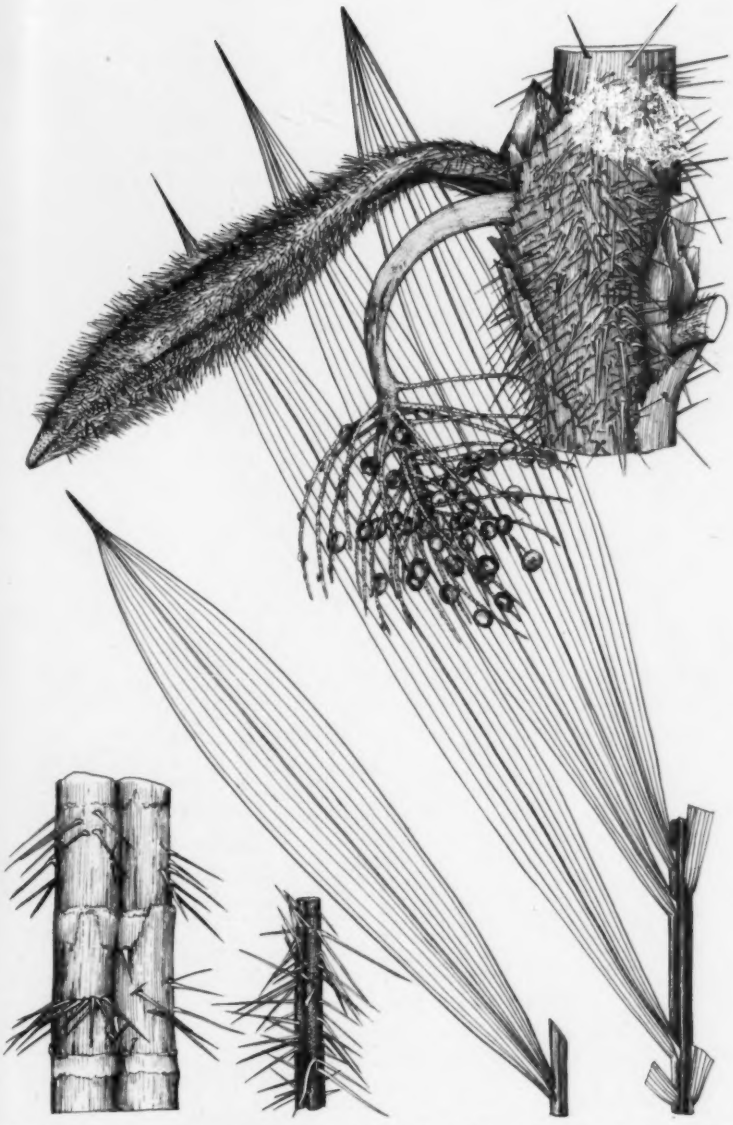
2. **Bactris Cruegeriana,** Grisebach & Wendl., Fl. Brit. W. Ind. 520 (1864). Fig. 159.

Leaves long-pinnate, rachis bearing scattered slender very sharp black spines 3–5 cm. long; pinnæ subopposite or irregular in placement, with blank spaces on rachis, very narrow, 30–40 probably more cm. long, 2–3 cm. broad, narrowly but not extendedly acuminate, thin in texture, with many thin parallel veins, surface glabrous, margins bearing many very sharp forward-pointing setæ 3–5 mm. long: spathe at maturity about 10–11 dm. long, about 10 cm. broad, narrowed to a stalk-like base, covered sparsely with slender hair-like black prickles 2 cm. and less long; spadix with a long flattened curved peduncle, the rachis very short ("rachis reduced," Grisebach), the simple branches in fruit extending forward and not divaricate: fruit oblate-globose, abruptly pointed at apex and narrowed to base, about 2.5 cm. long and broad, glabrous and unarmed; calyx short, with scalloped closely applied margin.

Trinidad: "uncommon, at Coroni" as stated by Grisebach, apparently on the authority of Crueger; MacNair Ravine, Sable Reserve, *J. S. Beard;* Carapachiana, *Seifriz.* I have not taken this palm myself. One is none too certain of the identity of plants customarily referred to the species. Our assurance of it rests only on the description in Grisebach; he quotes Crueger as stating the fruit to be globose and 15–18 lines in diameter, but the dry ones in my collection are not quite as large as that.

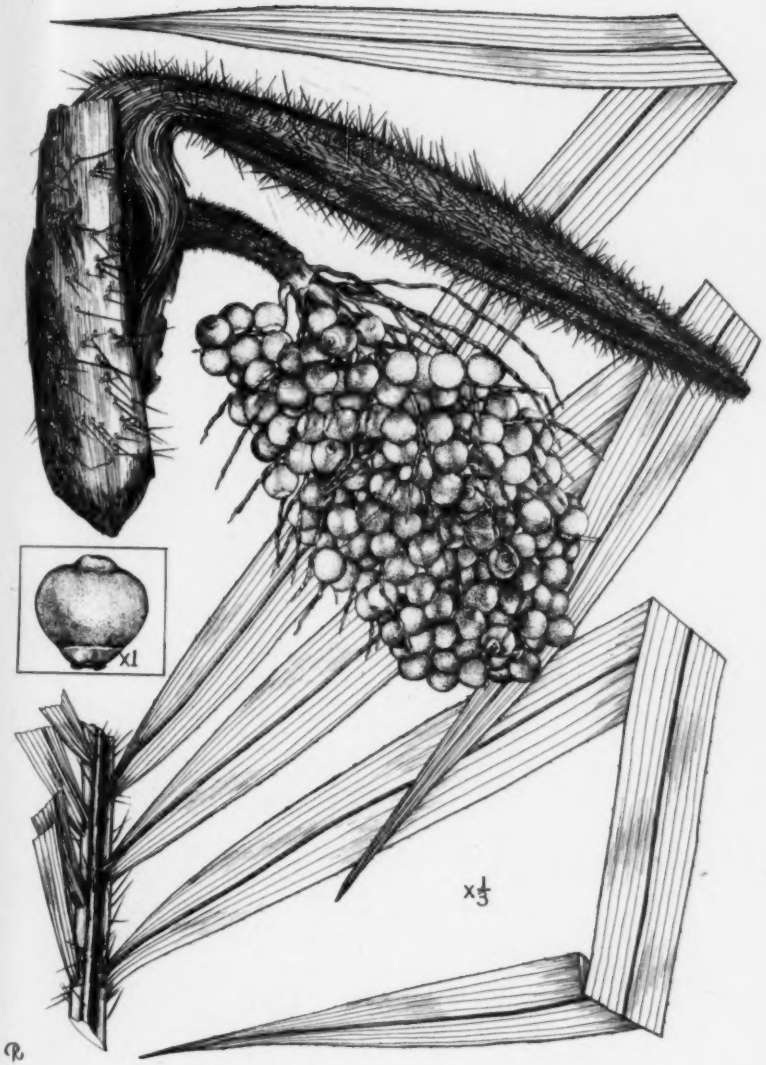
3. **Bactris Cuesa,** Crueger in Grisebach, Fl. Brit. W. Ind. 520 (1864). Figs. 160, 161.

Erect, 6–8 m. tall, two or three trunks together but not gregarious:



158. BACTRIS SAVANNARUM; pinnæ, spathe, spadix with continuous axis, trunk (left bottom), petiole. × ⅓.

159. Bactris Cruegeriana; foliage, broad spathe, spadix. × ⅓.



160. Bactris Cuesa; pinnæ, spathe, spadix, fruit.

leaves large, long-pinnate, pinnæ irregularly placed and with blank spaces on the rachis; blade of pinna long-lanceolate, 14–16 dm. long, 3–5 cm. broad, attenuate to point, strongly many-nerved, margins more or less appressed and briefly setose; rachis bearing scattered weak prickles 5–20 mm. long: spathe long-cylindric, 9–10 dm. long, covered with upstanding black hair-like spines 5-25 mm. long, bent over near base but hardly produced into a manubrium or peduncle; spadix 6–8 dm. long over all, peduncle stout, deflexed and declined, axis or rachis continued through the cluster and from which the many short branches divaricate: fruit oblate-globular, about 15–18 mm. long and broad when dry, nearly truncate to short apex, abruptly narrowed to base; calyx short, closely appressed, margin lightly lobed or crenate.

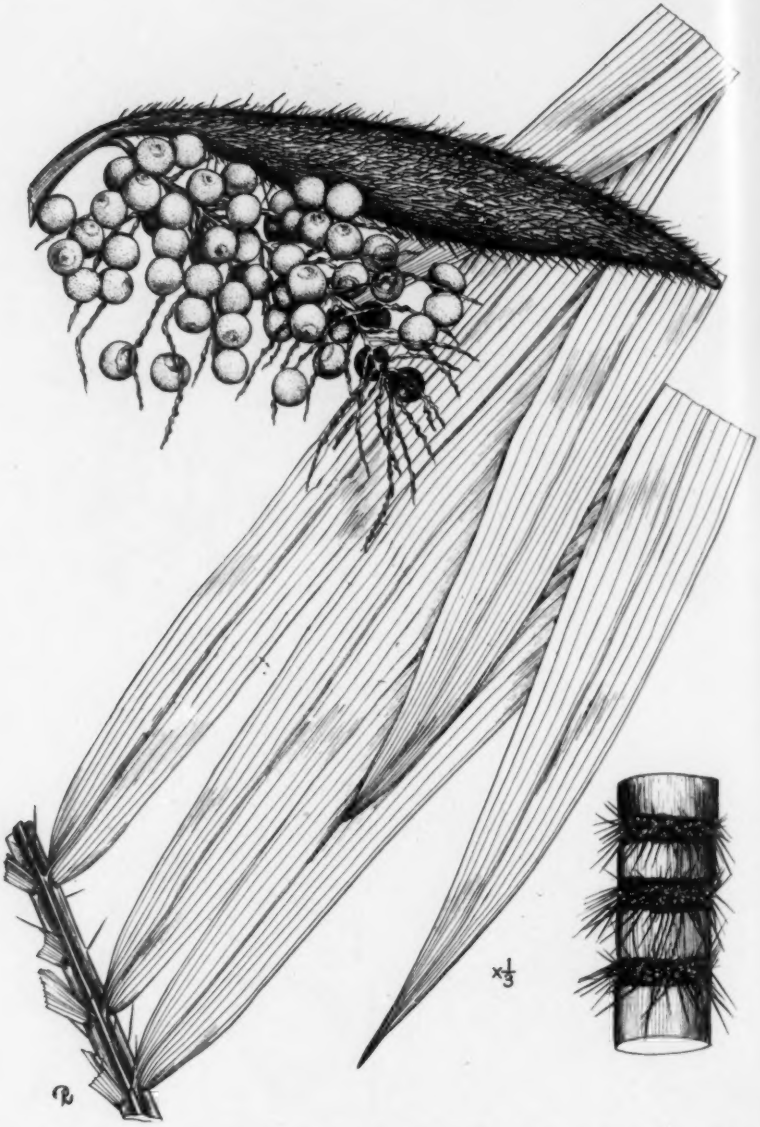
Trinidad: in dark woods, Cumuto in St. Andrews, Long Stretch, and Blue Mountains, *Bailey;* Arena Reserve, *J. S. Beard.* Cuesa is presumably a vernacular name of the palm. This species is not to be confused with *Bactris Cuesco,* Engel, of Colombia.

4. **Bactris Sworderiana,** Becc. in Fedde, Repert. xvi, 437 (1920). Fig. 162.

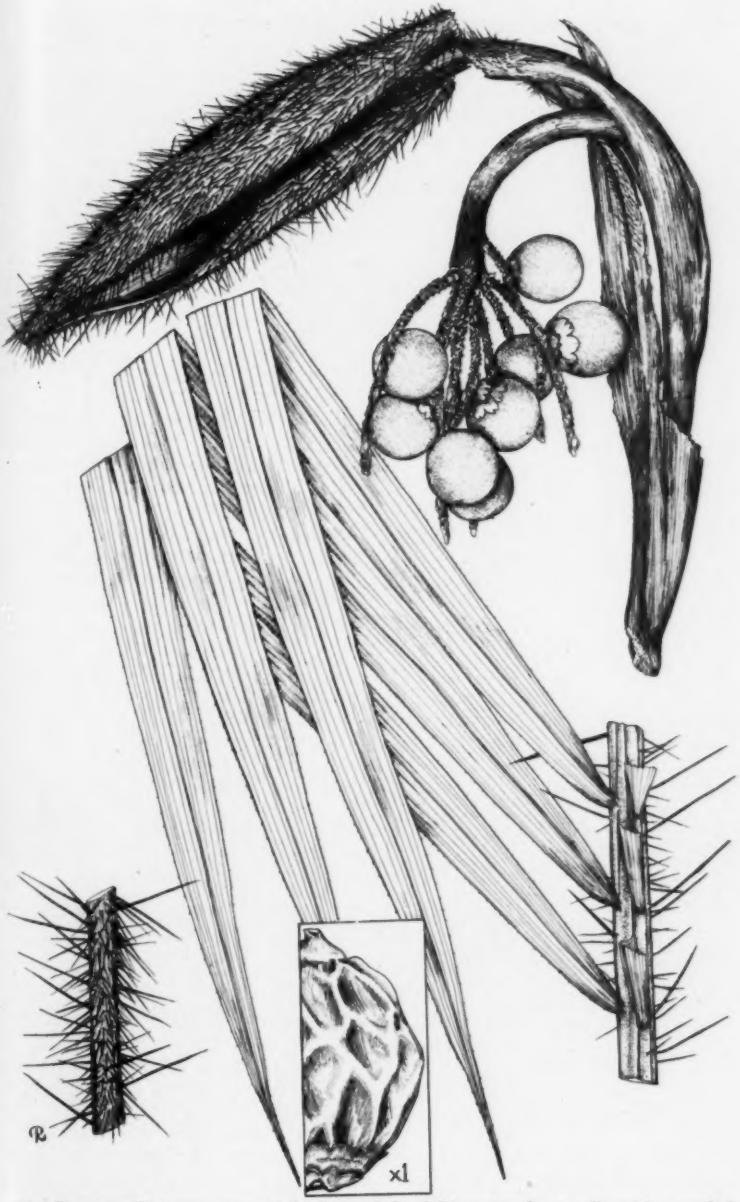
Tree 8–17 m. tall, trunk single, or many close together, with flat-spreading coma or crown: leaves 2 m. plus long, interruptedly pinnate; pinnæ

161. FRAMEWORK of spadix of *Bactris Cuesa,* to show continuous axis.

162. BACTRIS SWORDERIANA; pinnæ, shaggy spathe, spadix, fruit.



163. Bactris circularis, showing the annulate trunk; pinnæ, spathe and spadix.



164. Bactris Broadwayi; petiole (lower left), foliage, spathe, spadix with rounded fresh nuts, all × ⅓, dried nut at bottom.

6–7 dm. long and 4 to about 6 cm. broad, many-ribbed, acuminate, margins now and then bearing a brief very slender prickle as also the midrib underneath, rachis bearing deflexed black prickles 1–4 or 5 cm. long: spathe long, to 10 dm. and narrow, densely covered with glossy black spines 1–3 cm. long, not narrowed at base into a different manubrium or peduncle-like handle; spadix 6–8 dm. long, downwardly curved with a black-spiny peduncle, axis continuous and bearing a few stray hairs, branches 6–15 cm. long and divaricate but becoming ascending toward apex: fruit top-shaped, about 18 mm. long and broad, truncate at top with a central point, tapered to base; calyx about 4 mm. deep, strongly veined, margin closely applied and practically entire.

Tobago: in woods at Caledonia, *Broadway 4014* (type), *Bailey 146;* Roxborough-Parlatuvier Road, *J. S. Beard 98;* near Roxborough, *Bailey 130.*

†5. **Bactris circularis,** spec. nov. Fig. 163.

Erecta ad 10 m., truncus unicus vel interdum etiam quintuplex, circa 5–10 cm. diam., circularibus albidis nudis fasciis 2–3 cm. latis et mediis liris spinarum nigrarum 2–3 cm. longarum: folia 1 m. vel plus longa; pinnæ subopposite et nonnullæ partes rachis vacuæ, 6–8 dm. longæ et 4–5 cm. latæ, multinervatæ subter, margines spiculis, rachis petiolusque debilibus spinis nigris 1–2 cm. longis: spatha 30 cm. longa, obsita aculeis 2–3 cm. longis; spadix laxa, sæpe duplex, 25–30 cm. longa cum matura: fructus globulares, 15 mm. diam.; calyx parvus, appressus, non profunde lobatus.

Erect to 10 m., trunks four to five or sometimes one in a single stand, 5–10 cm. diam., the nodes or rings separated 2–3 cm. and bearing divaricate and deflexed black spines 2–3 cm. long (whence the name *circularis*): leaves 1 m. more or less long; pinnæ alternate or subopposite with blank spaces on the rachis, 6–8 dm. long, 4–5 cm. broad at middle of leaf, not slenderly tapered to apex, strongly many-nerved on under surface, margins rough with little points but hardly armed, rachis and petiole bearing scattered thin weak black spines 1–2 cm. long: spathe about 30 cm. long, narrow, closely covered with black prickles 2–3 cm. long, constricted toward base into a handle-like portion; spadix loose and open, perhaps double or twin, hanging in fruit and then 25–30 cm. long: fruit globular, about 15 mm. diam.; calyx small, appressed, margin shallowly lobed.

Trinidad: Melajo, St. Andrews, *Bailey 158.* A striking looking bactrid with its ridged rings of black spines and intervening whitish naked bands.

†6. **Bactris Broadwayi,** spec. nov. Figs. 164, 165.

Valde foliosa, erecta, 8–10 m. alta, trunci pauci vel unici, 5–8 cm. diam., uniformiter sed non dense aculeati: folia pendentia, 1 m. vel plus longa, æque pinnata, glauca vel albida subter; pinnæ circa 1 m. longæ, 2–3 cm. latæ, tenuiter multinervatæ, margines setiferi, rachis spinis 1–4 cm. longis: spatha 25–30 cm. longa, dense spinosa; spadix simplex, brevis, axis non continuus, rami 12–13 cm. longi: fructus pauci, pæne globosi, 4 cm. longi, 3 cm. lati, rostrum valde breve; calyx stricte appressus, in duabus continuationibus, margines obtuse lobati.

Erect, 8–10 m. tall, very leafy, few trunks in a single stand, boles 5–8 cm. thick, uniformly but not closely prickly: leaves evenly and equally pinnate, 1 m. and more long, gracefully drooping, lighter colored or somewhat glaucous underneath; pinnæ about 1 m. long, 2–3 cm. broad, long-acuminate, lightly many-nerved, margins closely beset with small sharp forward-pointing setæ; rachis bearing scattered black spines 1–4 cm. long; petiole heavily prickly with an under layer of short depressed prickles and also protruding spines to 4 cm. long; spathe 25–30 cm. long and 4–6 cm. thick, densely covered with brown-black prickles 1–2 cm. long; spadix simple and short, flat curved peduncle brown-woolly but not aculeate, axis not continuous and the few short branches forward-looking, about 12–13 cm. long: fruits relatively few, nearly globular, 4 cm. long, 3 cm. thick when dried, beak very short but evident; calyx tightly appressed in two series, margin obtusely lobed.

165. GRACEFUL HABIT of *Bactris Broadwayi* in forests of Trinidad.

Trinidad: Mac Nair, *Bailey 112*. Species dedicated to the memory of W. E. Broadway, 1863–1935, Fig. 166, connected with the Department of Agriculture, Trinidad, from 1914 to 1923, with whom I had many satisfactory collecting trips on the island.

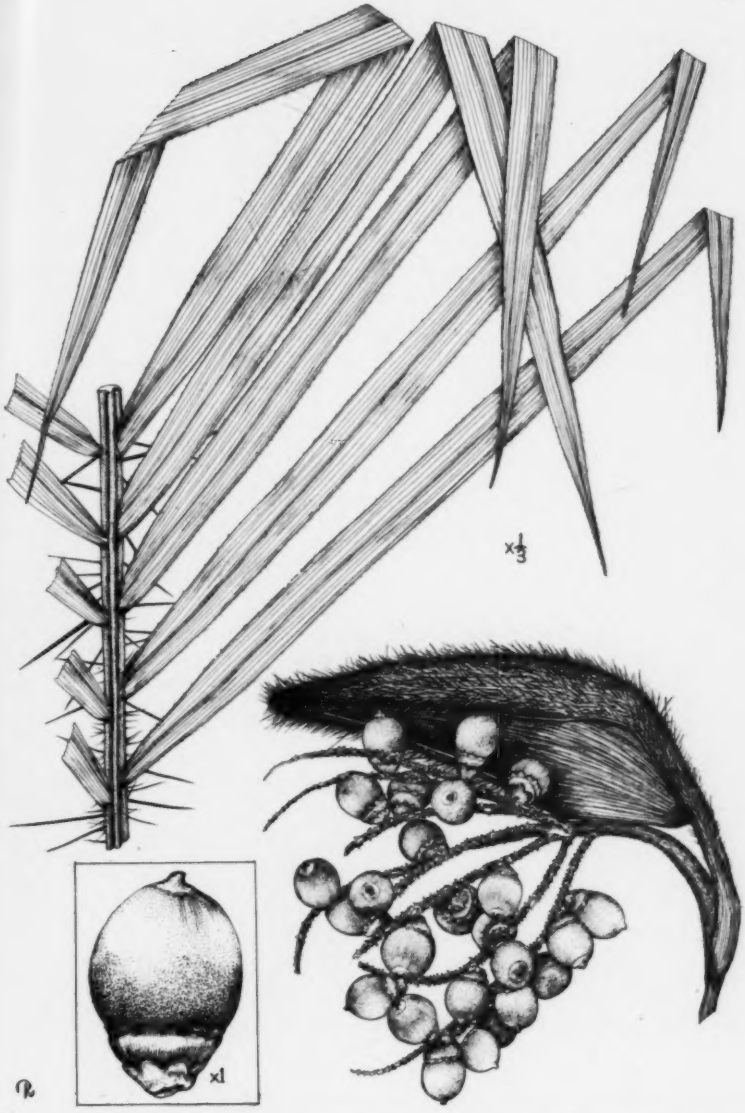
†7. **Bactris ellipsoidalis,** spec. nov. Fig. 167.

Valde gracilis, 6–7 m. alta, trunci pauci vel unici: folia æque pinnata,

166. W. E. Broadway, for whom *Bactris Broadwayi* is named, collector of Trinidad and Tobago, and of the Guianas, companion on many excursions.

1 m. plus vel minus longa, albidiora subter; pinnæ oppositæ vel subopposita, tenues, 5–6 dm. longæ, 2–2.5 cm. latæ, nervi laterales pauci, margines minute setosi; rachis paucis spinis rectis 1–4 cm. longis; petiolus multis spinis 1–6 cm. longis: spatha 2–3 dm. longa, 8–10 cm. lata, dense obsita nigris spinis gracilibus 2 cm. vel minus longis; spadix 18–20 cm. longa, axis non prolongatus, rami ascendentes: fructus ellipsoidales, circa 3 cm. longi et 2 cm. lati, rostrum apicale breve, angustatum ad basin; calyx duplex, appressus, margo obtuse lobatus.

Very slender, erect to 6 or 7 m., trunk single or few, armature not unusual: leaves continuously pinnate, 1 m. more or less long; pinnæ subopposite to opposite, lighter colored but hardly glaucous underneath, very narrow, 5–6 dm. long, 2–2.5 cm. broad, apex gradually attenuate, lateral veins few and not very strong, margins minutely setose, prickles on rachis straight, 2–4 cm. long with shorter ones sometimes between, few in number; petiole very slender, bearing many prickles



167. BACTRIS ELLIPSOIDALIS, with foliage, spathe and spadix, mature nut at bottom.

from less than 1 to 6 cm. long: spathe short and broad, 2–3 dm. long, 8–10 cm. broad at expansion, narrowed at base to a handle-like part, densely covered with black hair-like prickles 2 cm. or less long; spadix small, 18–20 cm. long including flat woolly curved peduncle, axis not prolonged, branches pointing forward and at fruiting time bearing many elevated points: fruit (not fully mature) ellipsoidal, about 3 cm. plus long, 2 cm. broad, with short apical point, narrowed to base; calyx a closely appressed double cup one-third length of nut, margin obtusely scalloped.

Trinidad: MacNair, *Bailey 113.*

†8. **Bactris planifolia,** spec. nov. Figs. 168, 209.

Gracilis, 5–8 m. alta, coloniata: folia plana, librata, 1 m. vel plus longa, uniformiter pinnata, semi-glauca subter, petiolus obsitus debilibus spinis brunneis, rachis spinis dispersis 1–3 cm. longis; pinnæ angustæ, 1–2.5 cm. latæ, 4–5 dm. longæ, multi-nervatæ, margines spinulosi: spatha circa 20 cm. longa, 4 cm. lata, obsita brunneis aculeis piliformibus; spadix circa 18 cm. longa, simplex, axis non extensus: fructus elliptici, 4 cm. longi, 2.5 cm. lati, angustati ad rostrum breve; calyx circa quarta pars nucis, duplex, margo obtuse dentatus.

In broad dense clumps with flatly expanded horizontal leaves, some of the trunks 5–8 m. tall, boles with ordinary spinescence and 4–6 cm. thick: leaves 1 m. and more long, evenly pinnate, semi-glaucous underneath, thin in texture, petiole shaggy with brown weak short prickles and a few of them to 3 cm. long, rachis bearing scattered spines some of which are 3 cm. long; pinnæ subopposite to alternate, very narrow, 4–5 dm. long, 1–2.5 cm. broad, with many weak parallel nerves, closely and briefly spinulose on margins, glabrous both surfaces: spathe about 20 cm. long and 4 cm. broad, narrowed to a manubrium or handle, thickly covered with brown hair-like prickles 1.5 cm. and less long; spadix about 18 cm. long, simply branched at apex, axis not continued, shank decurved and brown-tomentose: fruit elliptic, about 4 cm. long and 2.5 cm. thick, tapered to a prominent short beak; calyx-cup nearly or about one-fourth length of nut, double, margin obtusely dentate.

Trinidad: Siparia, St. Patrick, *Bailey 120.* Said to be called "Rosoi" by natives.

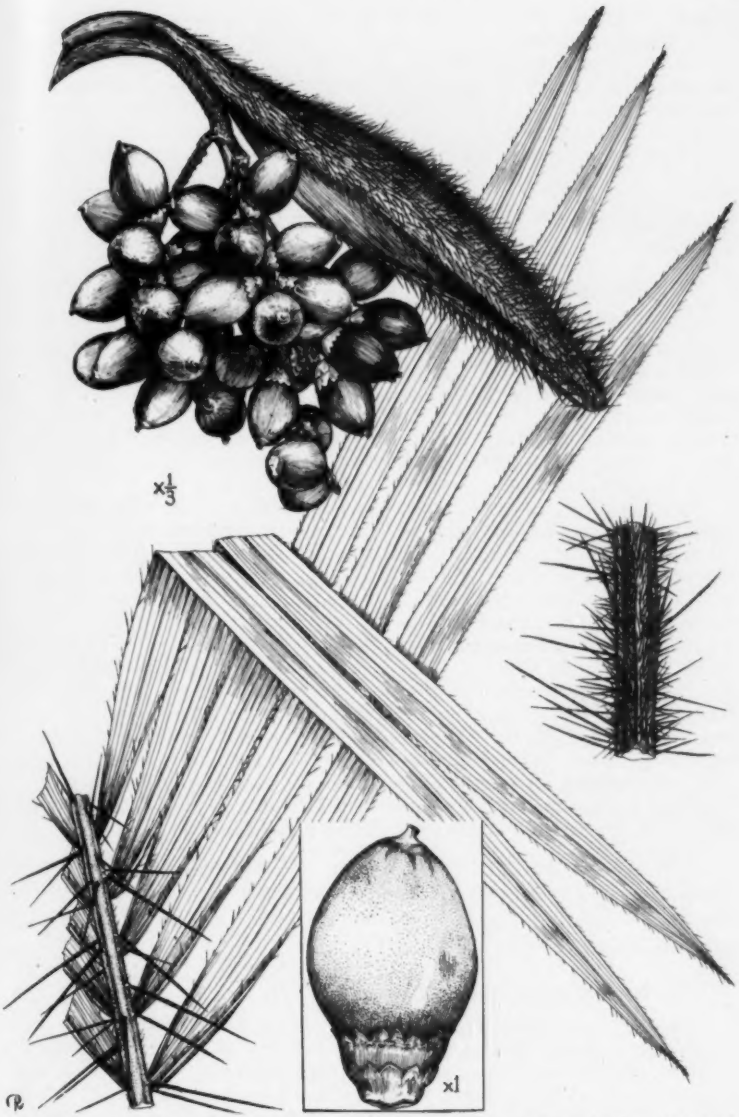
†9. **Bactris obovoidea,** spec. nov. Fig. 169.

Gracilis: folia 1 m. vel plus longa, uniformiter pinnata; petiolus et rachis hirsuto-tomentosa in superficie, spinæ maximæ 5 cm. vel plus longæ; pinnæ valde angustæ 1–1.5 cm. latæ, 1 m. longæ, apex graciliter acuminatus, valde laterali-nervatus, margines spinulosi: spatha 2–3 dm. longa, 5 cm. lata, aculeis piliformibus basi alba 1–2 cm. longis; spadix 18–20 cm. longa, ramosa apice, axis non continuus: fructus obovoidea, 4.5–5 cm. longi, 2.5–3 cm. lati, latissimi super medium; calyx duplex, 1–1.5 cm. altus, pars interior tres partes exterioris partis et irregulariter et profunde lobata.

Slender palm with very narrow leaflets and very spiny leaf-rachis and petiole, both of which are scurfy on the surface and strongly angled; pinnæ uniformly placed, subopposite to alternate, rigid, strongly side-ribbed, about 1 m. long, 1–1.5 cm. broad, apex long and slender, margin somewhat

168. BACTRIS PLANIFOLIA with bit of petiole, pinnæ, spathe and spadix and pointed fruits. × ⅓.

169. Bactris obovoidea; pinnæ with prickly margins, section of rachis, spathe and spadix, fruits broadest above the middle. × ⅓.



170. BACTRIS CATERI, with attractive pointed nuts not always equal-sided (see bottom), pinnæ with prickly margins, piece of petiole.

spinulose: spathe about 2–3 dm. long and 5 cm. broad, sparsely covered with hair-like prickles 1–2 cm. broad with whitish bulbose base; spadix 18–20 cm. long, short-branched at apex, axis not continued, decurved peduncle flat and roughly brown-tomentose: fruit large, obovoid, 4.5–5 cm. long, 2.5–3 cm. thick, broadest above the middle, abruptly narrowed to short point, long-tapered to base; calyx-cup large, 1–1.5 cm. deep, double, inner cup thrice longer than the outer and irregularly deeply lobed.

Trinidad: at MacNair, *Bailey 114*. Striking plant for its narrow leaflets and large obovoid nuts; spines of leaf-rachis and petiole often 5 cm. and more long.

†10. **Bactris Cateri,** spec. nov. Fig. 170.

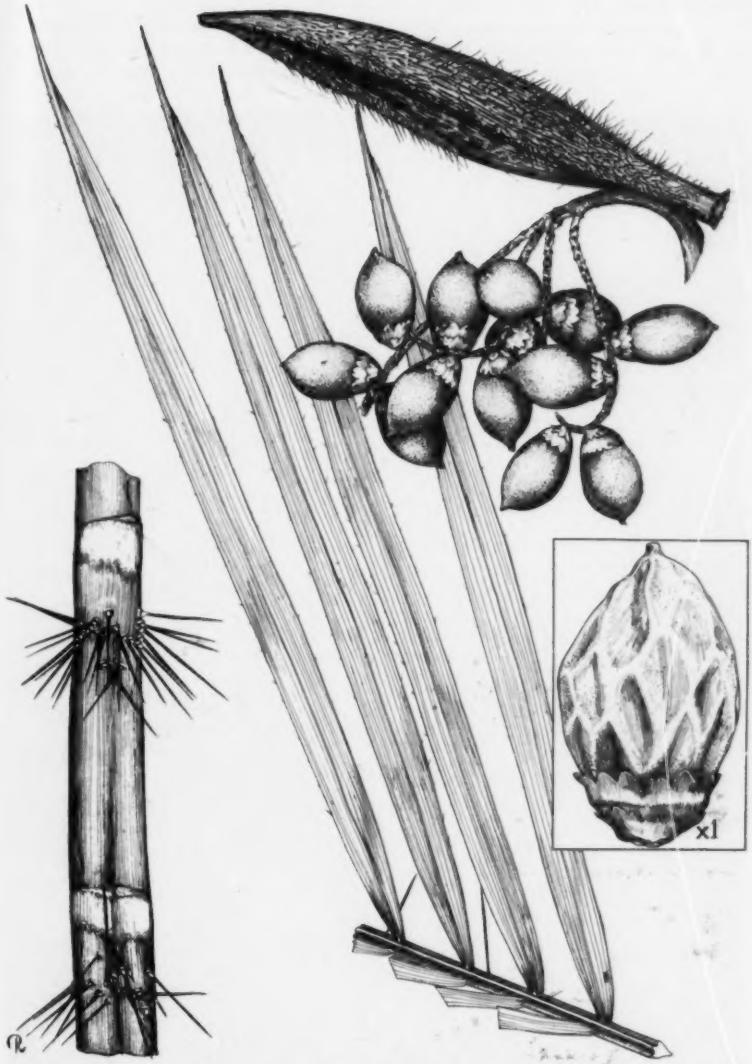
Coloniata, gracilis, lepidus, 6–10 m. alta: folia erecto-curva, conduplicata, uniformiter pinnata, spinosa in rachi petioloque, breviter armata in marginibus et nervis subter; pinnæ angustæ, 2–2.5 cm. latæ, longo-acuminatæ: spatha 3 dm. longa, 5 cm. lata, obsita spinis nigris basi alba 1 cm. vel minus longis; spadix 2–3 dm. longa, ramosa apice, axis non continuus: fructus elliptici, 4–5 cm. longi, 2–2.5 cm. crassi, angustati in utrasque partes, rostrum prominens; calyx duplicatus, 1 cm. vel plus longus, margo non profunde dentatus.

Erect, growing in dense clumps and colonies, 6–10 m. tall, foliage upright and trough-shaped, boles slender and well armored: leaves 1 m. and more long, evenly pinnate, heavily armed on the scurfy angled axis where the very sharp prickles may reach 6–8 cm. long, petiole heavily covered with short and long spines; pinnæ narrow, seldom more than 2–2.5 cm. broad, midrib underneath and margins sharply spiculose, lighter colored underneath, apex long-acuminate, lateral nerves several and prominent: spathe about 3 dm. long and 5 cm. broad, well covered with short black hair-like prickles not much if any exceeding 1 cm. long with the white base bulbose, narrowed at base to a manubrium or peduncle; spadix 2–3 dm. long, curved flat peduncle brown-tomentose, short ascending branches at apex and axis not continued, mature branches or rachillæ rough with points: fruit elliptic, broadest at or below the middle and tapered both ways, 4–5 cm. long, 2–2.5 cm. thick, beak prominent; calyx-cup duplicate, 1 cm. plus long, margin shallowly and almost obtusely scalloped.

Trinidad: Arena, San Rafael, *Bailey 100;* making attractive colonies along roads and open trails. Named in compliment to John Cater, Senior Assistant Conservator of Forests, who has aided greatly in finding the palms of Trinidad.

†11. **Bactris albonotata,** spec. nov. Fig. 171.

Erecta, 2–3 m. alta, truncus 3–4 cm. diam. spatiis vacuis 12–15 cm. longis inter fascias albas 2–3 cm. latas et circulos spinarum deflexarum 3–4 cm. longarum alterna, spinæ basi alba bulbosaque: folia interrupte pinnata, 1 m. vel plus longa, rachis spinis nigris 1–4 cm. longis, petiolus valde aculeatus; pinnæ 4–5 dm. longæ, gradualiter acuminatæ, 2 cm. vel plus latæ, margines spinulosi: spatha 2–3 dm. longa, 4–5 cm. lata, aculeata aculeis basi alba 1–2 cm. longis; spadix circa 2 dm. longa, axis non continuus:



171. BACTRIS ALBONOTATA, with prickly-edged pinnæ, uniform pointed nuts one of which full size is at the right, and conspicuous white-ringed trunk. × ⅓.

fructus longo-elliptici, 5 cm. longi, 2–3 cm. lati, longi-rostrati; calyx 1–1. cm. longus, duplicatus, margo multi-dentatus.

Strong and erect, 3–5 m. tall; trunks several growing together but distinct from each other, 3–4 cm. thick, with blank bare spaces 12–15 cm long between white bands 2–3 cm. broad, and below the bands rings of

172. Bactris beata native by a pond in Trinidad (central pinnate fronds) engraved from a print made twenty-five years ago. Beata: *excellent*.

deflexed spines 3–4 cm. long with white bulbose base: leaves interruptedly pinnate, 1 m. plus long, angled rachis with black spines now and then 1–4 cm. long, petiole very prickly with short little spines underneath and longer ones (to 5 cm.) with white base at intervals; pinnæ 4–5 dm. long, very gradually acuminate, 2 cm. or less broad, margins spinulose, lateral nerves few and strong: spathe about 2–3 dm. long and 4–5 cm. broad, narrowed to base, thinly provided with white-based prickles 1–2 cm. long with smaller spinelets underneath; spadix about 2 dm. long, simple with short branches at top and axis not prolonged, the flat peduncle more or less brown-tomentose: fruit long-elliptic to oblong, 5 cm. long when dry, 2–3 cm. thick, long-beaked; calyx-cup 1–1.5 cm. long, double, margin many-toothed, obtuse.

Trinidad: Arena, San Rafael, *Bailey 168*, in low place by stream among trees; trunks when split used for wattles in building; planted in Botanic Garden, Port-of-Spain, *Bailey 685* (collected 1922), as *Bactris major*, a name then employed for Bactris in general in Trinidad. Said to be known as Roseau palm.

†12. **Bactris beata,** spec. nov. Figs. 172, 173.

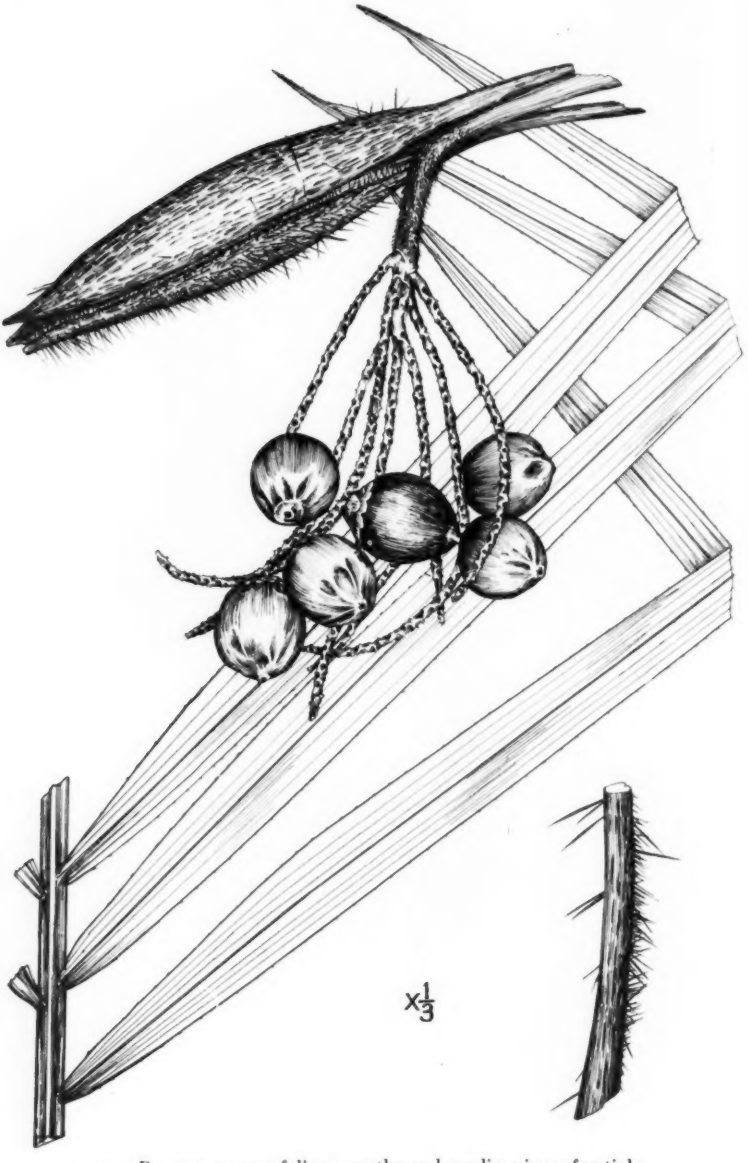
Coloniata, erecta, 3–4 m. alta, truncus spinosus, non albonotatus: folia 1 m. longa, interrupte pinnata, rachis sparsis spinis 3–4 cm. longis; petiolus gracilis, spinis variatis albo-bulbosis basi; pinnæ 6 dm. longæ, 2–3 cm. latæ, minute laterali-nervatæ, margines plus vel minus spinulosi: spatha 3 dm. longa, 4–5 cm. lata, obsita gracilibus nigrisque aculeis basi alba 1 cm. vel minus longis; spadix 2 dm. longa, ramosa prope apicem, axis non continuus: fructus pæne globulares, 3 cm. longi, 2.25 cm. lati, non attenuati; calyx duplex, .75 cm. altus, obtuse dentatus.

Attractive, erect, 3–4 m. tall, coloniate, trunks spiny not albonotate: leaves 1 m. long, expanding nearly flat, interruptedly pinnate; rachis flat but ridged, with scattered spines of uniform length 3–4 cm.; petiole slender, spines of different lengths and most of them white-bulbose at base, .5–4 cm. long; pinnæ 6 dm. long, 2–3 cm. broad, the upper ones not long-acuminate, finely side-veined, margins more or less spinulose: spathe 3 dm. long, narrowed at base to peduncle, 4–5 cm. broad, abundantly covered with black slender prickles 1 cm. or less long that bear a white bulbose base; spadix about 2 dm. long with rough-tomentose decurved shank and ascending branches from near the apex and without upstanding points after fruiting, axis not continuous: fruit nearly oblong, about 3 cm. long, 2.25 cm. broad, not attenuate at either end; calyx-cup shallow, of 2 nearly equal series, .75 cm. deep, margins obtusely scalloped.

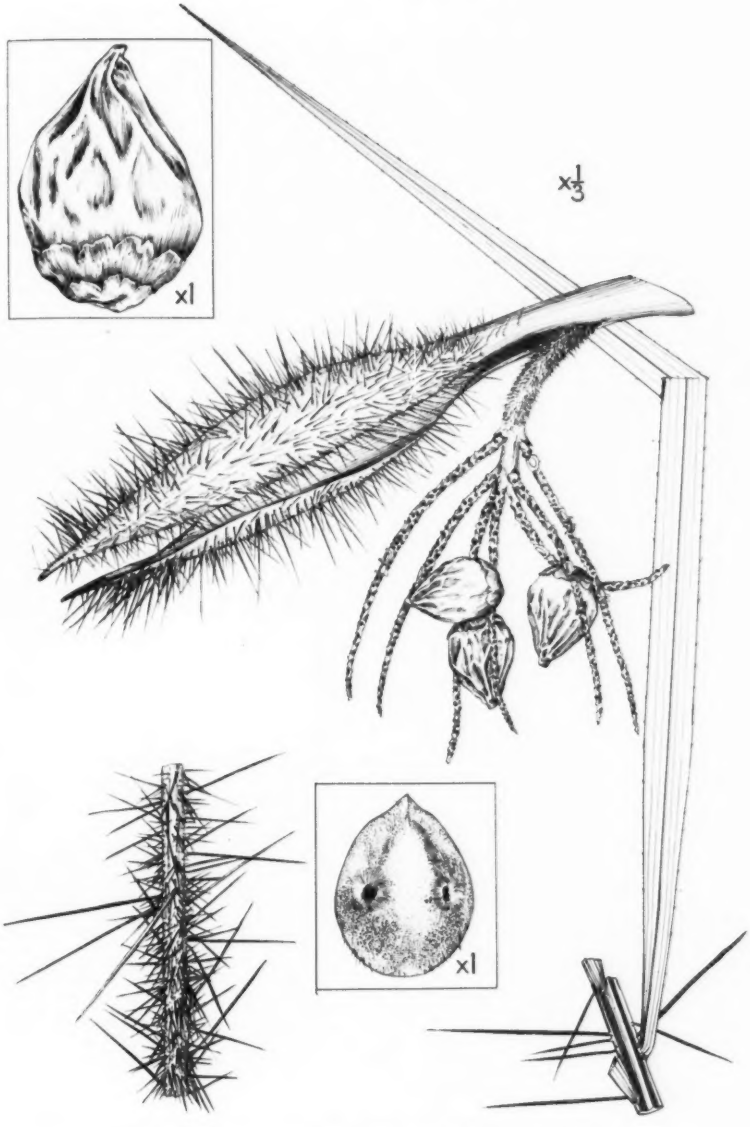
Trinidad: at waters edge, Mayaro, *Bailey 667* (collected 1922), a handsome plant.

†13. **Bactris Swabeyi,** spec. nov. Fig. 174.

Arbor valde spinifera: folia uniformiter pinnata, 1 m. longa, rachis multis spinis 4–10 cm. longis, petiolus dense spinosus; pinnæ angustæ firmæque, 6 dm. longæ, 1–1.5 cm. latæ, nervi laterales validi, margines aliquid spinulosi prope apicem: spatha 2–3 dm. longa, 5 cm. lata, spinis



173. Bactris beata; foliage, spathe and spadix, piece of petiole.



174. Bactris Swabeyi; pinna, spathe and fruit, petiole, seed near bottom.

tenuibus et piliformibus 2 cm. plus vel minus longis interdum basi alba; spadix 2 dm. longa, ramosa apice, axis non continuus: fructus ovoidea, 4–5 cm. longi, 3 cm. lati, angustati ad apicem a basi, rostrum prominens; calyx non profundus, duplicatus, 1–1.5 cm. altus, margo late dentatus.

Very thorny tree: leaves apparently uniformly pinnate, 1 m. and more long, the angled glabrous rachis bearing scattered black-brown spreading spines 4–10 cm. long, some of them with somewhat expanded whitish base; petiole densely black-brown-spinose, spines 1–6 cm. long; pinnæ narrow and stiff, folding lengthwise in the drying process, 1–1.5 cm. or less broad, strongly side-nerved, 6 dm. long, unarmed, margins somewhat spinulose toward apex: spathe 2–3 dm. long, 5 cm. broad, narrowed to a manubrium or handle covered with thin brown hair-like spines 2-3 cm. long, some of which may have a white bulbose base; spadix about 2 dm. long, rachillæ ascending near the top and axis not continuous, bearing only a few raised points, flattened curved peduncle rough-tomentose: fruit ovoid, 4–5 cm. long, tapered to apex from near the base, beak prominent; calyx-cup shallow and open, 1–1.5 cm. deep, duplicate, margin broadly dentate.

175. TECTOCOMIA SECTION of Acrocomia, trunk permanently holding the petiole-bases. From Gentes Herbarum, iv, fig. 264.

Trinidad: Southern Watershed Reserve, near Arboretum, *C. Swabey 13146* (collected 1937), now of the Forest Department, British Guiana.

6. ACROCOMIA—GRU-GRU PALMS

Heavy monœcious trees with single spine-bearing trunk and foliage, great spreading crown of pinnate leaves and long hanging clusters of abundant flowers and nut-like fruits mostly as large as walnuts, the spadix covered by woolly and variously spiny double sheaths or spathes. As occidental genus of traditionally confused nomenclature, monographed by Bailey in 1941 (Gent. Herb. iv, fasc. xii), when twenty-five species were accepted. Only one species is known on Trinidad-Tobago, separated at that time from the other species of the genus.

The monograph divides the genus Acrocomia nearly equally into two sections on the nature of the trunk: *Tec-*

tocomia, in which the mature bole is covered as with plates which are the persistent wide base of leaves, the leaf having been shed by the breaking of the petiole midway its length; *Sentocomia*, in which the petioles are eventually deciduous at the base, their hold on the trunk being then represented by concentric scars that are marked by rings of spines. To this second group belongs the Trinidad-Tobago Gru-gru. The Tectocomia group is represented clearly in Fig. 175. The process of defoliation in Sentocomia is seen in Figs. 176, 177, photographs taken on Tobago. Fig. 176 is a young tree, even though now in fruit, and the old leaves are still holding on. In Fig. 177, an older tree, the leaves have shed from the trunk, making a clean break at the base, and the rings of spines show forth. In Fig. 178 appears a fully mature tree with trunk bare except for the spines, taken at Bresil, San Rafael, Trinidad, showing the completed sentocomious bole.

176. SENTOCOMIA SECTION of Acrocomia, young tree of *A. ierensis* even though in fruit, leaf-bases still holding below.

ACROCOMIA,
Martius, Hist. Nat. Palm. ii, 66 (1824).

Erect trees, monœcious, often large and columnar, without crownshaft, the trunk with definite structure after the leaves fall, but usually marked by spines in concentric rings on bands; coma wide-spreading, composed of long pinnate leaves that gradually die and drop from the under part of the head: spathe interfoliar, double, at base of coma or crown, at first erect or ascending, then divaricate and at last hanging, the inner element or valve becoming the large brown-tomentose shield

known to the collector; spadix long and large with many lateral branches that bear a few pistillate flowers at base and very many staminate flowers above, stamens 6: fruit a spherical or mostly oblate hard body 3–4 cm. in cross diam., unarmed, with a thin brittle exterior; nutlet single, 1-seeded but with 3 external lines of division, 3 micropyles and one of them functioning, albumen white and continuous.

Acrocomia ierensis, Bailey, Gent. Herb. iv, 473, figs. 296–297 (1941). TRINIDAD-TOBAGO GRU-GRU. Figs. 176–179.

A. sclerocarpa, Auth. not Martius which is a Brazilian species.

A. aculeata, Auth. not Lodd. which is from Martinique.

Tree 8-10 m. tall at maturity, bole 3–4 dm. diam., sometimes thickened toward the summit, armed with rings of spreading sharp black spines 3–6 cm. or more long: leaves 2–4 dm. long, somewhat lighter colored underneath, midrib armed with spines of varying length, 1–10 cm. long, petiole spinose; pinnæ 30–40 pairs although not opposite or regularly placed, mostly 1–2 cm. broad, margins nude: persisting (inner) spathe 1 m. and more long, 4–5 dm. broad, densely brown-woolly and sometimes with a few spines: fruit spheric-oblate, 3.5 cm. high and broad, brownish-green when dry, surface smooth and featureless, calyx of 3 obtuse appressed lobes 1.5 cm. across.

177. SENTOCOMIA SECTION, leaves now fallen. *Acrocomia ierensis.*

Trinidad and Tobago, common on dry lands. The kernels yield oil; Freeman and Williams in Useful and Ornamental Plants of

178. Acrocomia ierensis, native tree on Trinidad and Tobago. Variable in size and aspect.

Trinidad and Tobago, 1927, write: "Rough planks cut from the trunk are sometimes used for building huts. Handsomely marked walking sticks are also made from the wood. The bud of unopened leaves is eaten as a vegetable, and the sweet pulpy portion of the fruit as well as the kernel is edible."

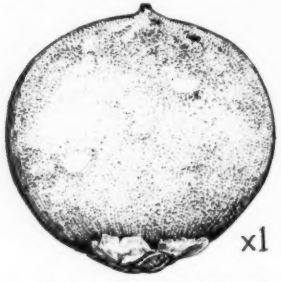
7. ASTROCARYUM—STAR-NUT PALMS

Of this genus of heavy spiny palm trees Max Burret recognizes forty-five species in his monograph of 1934 (Fedde, Repert. xxxv, 114–158), South American and for the most part Brazilian with the exception of one on Trinidad, one in Panama and very few from Mexico and Central America. The herbarium material of them in the institutions is so scant and unsatisfactory that knowledge of the genus is yet far from exact. There are many pictures on which we must rely even though it is often difficult to apply them to particular trees. The one on Trinidad, however, has never been illustrated nor the fruit described until now.

ASTROCARYUM, G. F. W. Meyer, Primitiæ Floræ Essequeboensis, 265 (1818), where the original species, *A. aculeatum*, from the Essequebo region in Surinam (Dutch Guiana) is yet in doubt, and the genus requires new definition.

Genus much like Bactris but tree mostly larger and usually with a single trunk, spathe and spadix much larger and longer and more bountifully flowered, staminate flowers sunken in pits in the rachis, nutlet or kernel commonly with 3 equally placed radiating pores (apparently whence *Astro-caryum*, star-nut), fruits larger with thicker indurated shell, pinnæ erose or only briefly bifid at tip.

Astrocaryum is akin to Acrocomia although persons knowing the two genera have no trouble in distinguishing them. Trunk of Astrocaryum is not tumid, not covered with permanent petiole-bases or concentric rings of spines; pinnæ likely to be briefly divided at apex or erose; perianth of pistillate flowers a brief tube or cup at base and the pistil-body long-conic; staminate flowers opening broadly, with 3–6 or more stamens; flowering branchlets very slender to base beneath pistillate flowers, like a stipe or stalk; fruit ovoid rather than oblate, longer than broad, beak very prominent, surface rough rather than smooth and glossy.



179. FRUIT of *Acrocomia ierensis*. Note the very brief point at apex.

Astrocaryum aureum, Grisebach & Wendl., Fl. Brit. W. Ind. 521 (1864). CUYULE. Figs. 180–184.

Tree 12–15 m. tall, trunk 3-4 dm. diam. at maturity and only obscurely ringed, splitting lengthwise into hard woody coarse-grained strips, bearing abundantly of flat bulbose-based deflexed spines 3–8 cm. plus long: leaves interruptedly long-pinnate, to 12 dm. long, erect-spreading to make a rather narrow long crown or coma, rachis with many flat black very sharp spines 4–5 cm. more or less long; petiole deeply grooved and pubescent, thickly covered in bunches with short and long black flat very sharp

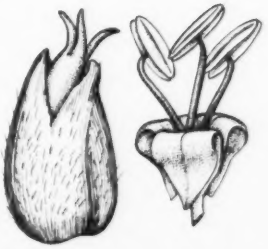
180. ASTROCARYUM AUREUM, Cuyule palm of Trinidad, conspicuous in its surroundings.

spines, some of them 15–20 cm. long; pinnæ many in groups or clusters, stiff, glossy on upper surface, strongly side-ribbed, 1 m. plus long, main ones 4–6 cm. broad, shallowly split at apex, margins somewhat spinulose or at least rough: spathes interfoliar, hanging, woody, 1.5–2.5 m. long, densely

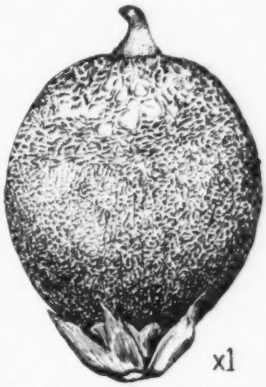
181. Part of fruit-cluster of *Astrocaryum aureum;* note the narrow lobes of calyx-cup.

182. FLOWERING STRAND of *Astrocaryum aureum.* × ⅓.

black- and brown-aculeate with prickles 4 cm. and less long and some of them white-based; spadix very long, axis 3–5 cm. thick and closely provided with short black slender but sharp prickles, branches numerous and close together, aureous (yellow-scurfy), 3–4 mm. thick at base and 3 dm. long, bearing a few separated pistillate flowers 2–3 cm. apart on the lower angles and densely crowded small staminate flowers of 3 stamens comprising remainder of the branchlet and deeply sunk in cavities, pistillate flowers ovoid-pointed, about 1.5 cm. long attended by short bracts at base: fruit hanging in great heavy clusters as long as a man, ovoid, 5–6 cm. long including the calyx-cup and the long narrow beak, 4 cm. broad, heavy and very hard, yellowish, rough but not armed, pericarp thick and bony hard; calyx in two series, the outer with narrow acute lobes 1–1.5 cm. long, inner part shorter with nearly or quite obtusish lobes; kernel or nut about 2.5 cm. thick either way, stony hard, irregularly rough and obscurely ridged but featureless, pores 2 or 3 and not evident, albumen white and homogeneous, center hollow, micropyle central lateral.



183. PISTILLATE AND STAMINATE flowers of *Astrocaryum aureum.* × more than 2.



184. MATURE FRUIT of *Astrocaryum aureum;* note the long rostrum or beak.

Trinidad: Buenos Ayres and Tllto, St. Patrick, *Bailey 125, 184;* in herbarium, places not indicated; Irois, St. Patrick, *Grisebach.*

8. MANICARIA—TIMITE PALMS

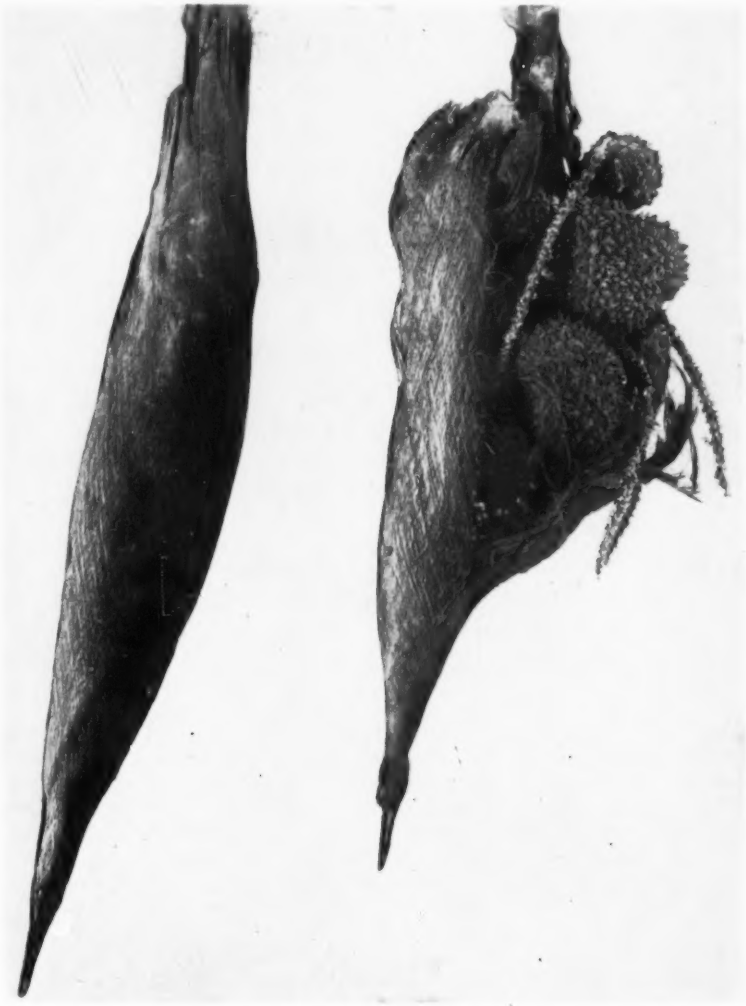
Timite is a strange small leafy spineless palm in Trinidad, growing in moist places, bearing large tubercled fruits in a bursting soft woven spathe or bag. It belongs to the occidental genus Manicaria; whether the genus has three or four species we shall now determine.

185. MANICARIA PLUKENETII in low places on Trinidad, epiphytes on the trunk.

Genus Manicaria was founded by Joseph Gaertner in 1791 in his historic book on fruits and seeds. He supposed it was native on Curacao and in Dutch Guiana. He named the plant *Manicaria saccifera* (sac-bearing: Latin *saccus*, a sack or bag). The tree, foliage and fruit he did not know or describe. In 1809 Nicolaus Joseph Jacquin founded a genus Pilophora, apparently not knowing Gaertner's work, with the species *P. testicularis*, of

the Caribbean region and perhaps elsewhere. This is supposed to be the same as *Manicaria saccifera*. Subsequently two Amazonian species have been added, *M. Martiana* and *M. atricha* by Burret.

Grisebach and Wendland, 1864, made a new and separate species of the Trinidad plant, *Manicaria Plukenetii*, but subsequently it was referred to



186. WOVEN SPATHES, closed and ruptured, of *Manicaria Plukenetii*.

M. saccifera. They said that *M. Plukenetii* differed in structure of the staminate flower and in the spathe, a question we are now to consider. The species was named for L. Plukenet, 1642–1702, who had a picture of an injured fruit, probably picked up on a shore, in his Phytographia published 1691–1696 (Fig. 187).

The Trinidad Manicaria appears to be a smaller tree than the one in Panama, which I have taken to be *M. sac ifera* (Gent. Herb. iii, 47, 1933). leaves of the Trinidad plant are more uniformly divided to the rib into narrower pinnæ, terminal pinnæ or divisions very narrow and truncate at apex, more strongly noticeably side-ribbed; spathe apparently shorter and probably more closely woven; calyx-cups on rachillæ not conspicuously attended by elongated bracts; fruits variable in size and epicarp but those I have seen on Trinidad more sharply tuberculate. With these suggestions of differences, an attentive student of the Trinidadian and mainland floras will undoubtedly be able to observe other distinguishing features.

Gaertner's picture of his *M. saccifera*, reproduced in Fig. 188, very clearly shows the long acute bracts on the deflorated rachilla, as does my inadvertent cut of the Panamanian Manicaria (in Fig. 30, Gent. Herb. iii) and suggests that the ascription of *M. saccifera* to the mainland plant is correct. Grisebach in his Flora of the British West Indian Islands, page 519, states that the conical gradually acuminate spathe of *M. Plukenetii* is not the pointleted spathe of Jacquin's figure of his tree (apparently of his *Pilophora testicularis*): I have noted the peculiar spathe in Jacquin's illustration and have not seen its match in nature.

MANICARIA, Gaertn. Fruct. et Sem. Pl., ii, 468 (1791).
Pilophora, Jacq. Fragm. Bot. 32 (1809).

Monœcious trees of medium height, unarmed, inflorescence interfoliar: leaves pinnate with continuing midrib, the blade divided in various degrees sometimes uniformly to the rib and at other times only part remaining entire or in extreme cases the entire leaf simple and lobed along the sides: flower-cluster a simple declined long spadix inside a thin tightly woven soft spathe without suture and torn open by the expanding cluster; lateral branches bearing a few pistillate flowers on angles near the base and very many staminate flowers in cups or hollows on the upper part subtended by more or less prominent bracts; style single, 3-lobed on an ovoid or obovoid 3-angled 3-celled ovary that exceeds the very short staminodia; stamens many, anthers versatile on slender filaments: fruit a single, double or triple large deeply tuberculate indehiscent body, each part size of a walnut or 3–4 cm. thick, shell hard but brittle, lined with reticulated fibers inclosing a smooth black nut or seed 2.5–3 cm. diam. inside a thin parchment-like integument; seed with adhering testa and raphe, albumen white and very hard, homogeneous, cavitous in center, hilum basilar.

Manicaria Plukenetii, Grisebach & Wendl., Fl. Brit. W. Ind. 518 (1864). TIMITE. TIMIT. Figs. 185–187.

M. saccifera, Auth. not Gaertn.

Tree, erect, 5–6 m. tall, mostly with short trunk (often covered with epiphytes) and abundant leafy crown: leaves pinnate, pinnatifid or in some cases almost undivided part of the way, 1–2 m. long, 5–6 dm. broad, stiff, glabrous unless somewhat scurfy when young; pinnæ or pinnate lobes 1–6 cm. broad, apices pointed, strongly many-ribbed, terminal ones nearly or quite truncate: spathes cloth-like and brown, 4–5 dm. long, cylindric until they begin to burst from pressure from within, pointed at apex, narrowed at base; spadix flat, zigzag near base with 1–3 pistillate at angles, many staminate flowers on upper part of each rachilla, all flowers in shallow socket or flattened depression with subtending bracts inconspicuous: fruit of a single oblong sharply tuberculate nut or of 2 or 3 amalgamate nuts.

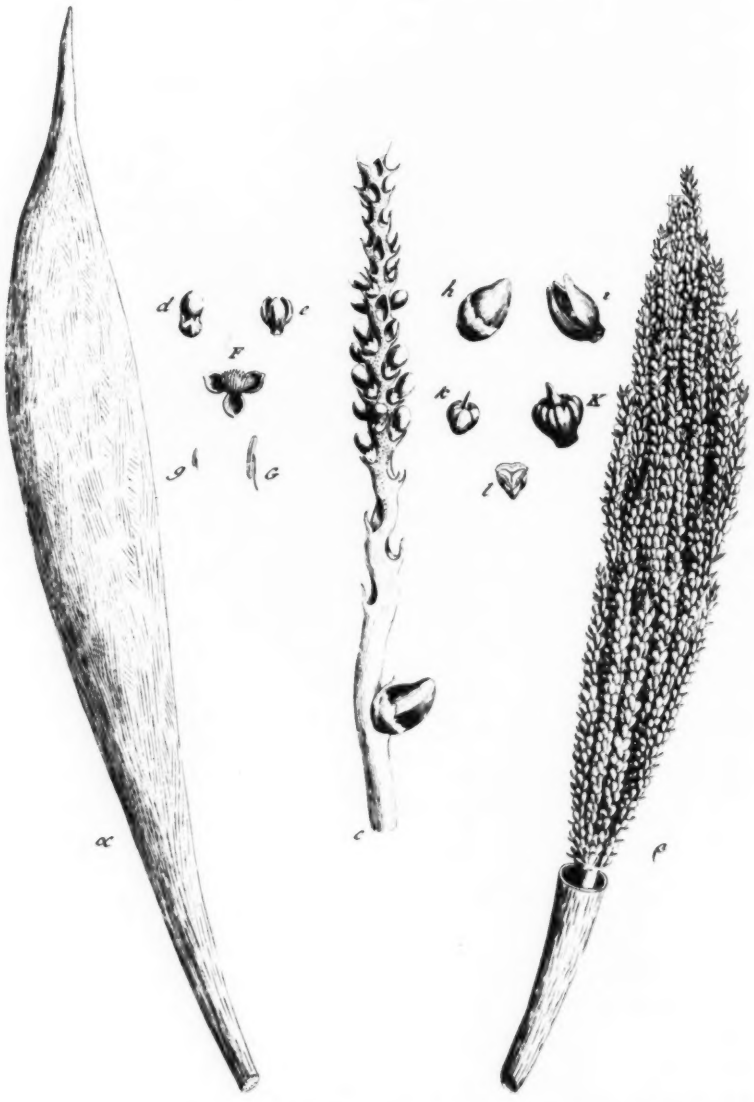
Widely spread in low moist places and along stream bogs in Trinidad. Grisebach attributes it to Irois in St. Patrick; I have taken it at Cumuto and Aripo; I have specimens from Arena It is not recorded on other West Indies islands. The nuts of Manicaria with outer covering perhaps macerated and lost float in the sea for long distances; Grisebach records such occurrences on Barbados and Jamaica, and I have a nut picked up on the shore at Miami Beach, Florida, and another from the beach at Cameron, Louisiana.

187. OLD NUT of Manicaria, from Plukenet.

9. YUYBA—YUYU PALMS

One species of this confused assemblage grows on Trinidad, in all the literature known as *Bactris simplicifrons.* The *Bactris simplicifrons* of Martius, however, was based on a palm in Brazil, and is a bushlet very different from the Trinidad plant; it is said to grow widely in American tropics but in fact is little known. In the Royal Botanic Garden at Port-of-Spain I have collected a palm (as had Broadway) grown under the name *B. simplicifrons,* but it is not that plant and I do not know the source of it: the species is *Hyospathe elegans.*

Barbosa segregated Amylocarpus from Bactris with nineteen species, eight of which were taken over from that genus and the others described as new, all of them Brazilian. His generic name is antedated many years by a genus of fungi (Amylocarpus, Currey 1857), and is therefore untenable. In choosing a name to replace it I adopt a divisional name employed by Bar-



188. MANICARIA SACCIFERA as originally figured by Gaertner in 1791, showing spathe at left, spadix at right, rachilla in center, details of flowers.

189. YUYBA TRINITENSIS, showing foliage, spathes and spadices, three fruits. × 1/3.

bosa under Amylocarpus,—Yuyba, name derived, as Barbosa asserts, from the fact that some species bear little prickles (*yú*). I assume the second *y* to be a vowel, and satisfy myself by pronouncing the word *Yuee-ba*. Outside Brazil, we now know five species in Surinam and this one on Trinidad, but not yet all described.

Genus Amylocarpus was accepted by Drude in Nachtrage iii, 1908, of Engler & Prantl, Die Natürlichen Pflanzenfamilien; he noted that the name is antedated and must be displaced but did not propose a substitute. The genus has subsequently been returned to Bactris although not on the Barbosan basis; the differences are so great and constant as to make such reference undesirable. The species now are beginning to be understood.

†**Yuyba,** nom. nov.

Amylocarpus, Barb.-Rodr. in Contr. Jard. Bot. Rio, iii, 69 (1902), not Currey 1857.

Small understory nearly or quite unarmed monœcious palms, parts all of reduced size: leaves pinnate or pinnately parted: spathes infrafoliar, 9 cm. or less long, very narrow, unarmed; spadix very short and strongly declined when it becomes visible, 6–8 cm. or less long, the axis single or branched from base into two or three; stamens 6, on base of petals; calyx and corolla urn-shaped or cylindric and forming a tube lightly dentate at apex: fruit very small, commonly unarmed, usually scarlet at full maturity, albumen white and homogeneous.

†**Yuyba trinitensis,** spec. nov. Fig. 189.

Bactris simplicifrons, Grisebach, Fl. Brit. W. Ind. 519 (1864), not Martius; *Amylocarpus simplicifrons*, Barb.-Rodr. was based on *B. simplicifrons* of Martius and not on the Trinidad plant, and it now becomes †**Yuyba simplicifrons,** comb. nov.

Erecta, 1 m. vel plus alta, inermis, glaber, truncus rectus, 1 cm. vel minus diam.: folia tenuia, bifurcata, opaca; lobi divaricati, curvi, 25–30 cm. longa, 5–6 cm. lata, costæ 6 vel 7: inflorescentia simplex, deflexa, 3–4 cm. longa; flores solitarii in axe, 1–2 mm. longi, breviter dentati apice; spatha divaricata vel deflexa, 5 cm. longa, circa 1 cm. lata: fructus pæne globulares, 1 cm. diam., rostrati, rubri; semen unicum, albumen album, homogeneum.

Erect bush to about 1 m. tall or a little more, leafy, glabrous, unarmed; stem (trunk) 1 cm. or less thick, very straight: leaves thin, bifurcate, dull rather than glossy; each of the 2 lobes curved to the narrow acute tip, about 25–30 cm. long and 5–6 cm. broad, main ribs 6 or 7: inflorescence simple, down-curved, 3–4 cm. long, from a stout short peduncle; flowers singly placed rather than clustered, each one an oblong or cone-like body briefly dentate at apex; spathe about 5 cm. long and 1 cm. broad, pointed, divaricate or becoming deflexed: fruit red, nearly globular except for the prominent beak, or indistinctly oblong, about 1 cm. long over all; seed single, practically filling the cavity, albumen white, homogeneous.

Trinidad: Valencia wood, *Prestoe;* Mona forest, *Broadway;* Sangre Grande, three and one-half mile post, *R. O. Williams;* San Pedro Reserve,

J. S. Beard. Specimens of *Geonoma vaga* have been brought to me in Trinidad as this plant.

Bactris acanthocnemis is accredited by Grisebach to Trinidad and Guiana. Martius, in founding the species, knew it only from Cayenne, French Guiana. Drude later made it a variety of *B. simplicifrons*, a disposition accepted by Burret in 1933; both men assign it only to Cayenne. I do not know the plant on Trinidad-Tobago.

10. EUTERPE—THE MANAC PALMS

The genus Euterpe is little analyzed by collectors and palm fanciers. It is widespread in the western hemisphere from Cuba to Trinidad and the Guianas to Venezuela, Costa Rica, Panama, Colombia, Ecuador, Bolivia, Peru, Brazil where it is particularly well represented in Amazonas. There are perhaps fifty species, passing under many vernaculars in the different countries. We must take out of it a few species under the name Prestoea.

Taxonomically, the genus and the type species, *Euterpe globosa*, had a bad start, having been founded by Gaertner in 1788 on fruits and seeds of which he did not know the origin and with which he confused seeds of other palms from another country. He printed a small picture of these fruits and seeds, and on this evidence we must base our knowledge of the founding of the genus. In 1823 and subsequently Martius identified the Gaertner picture with palms of the western hemisphere, and this application of the name was followed by J. D. Hooker in Bentham and Hooker Genera Plantarum, 1883, and previously by other authorities. Subsequently this disposition was adopted by Beccari, Drude, Burret. Suggestion was made long ago by Blume that perhaps Gaertner had seeds from the Mascarene Islands east of Madagascar, but I have now monographed the palms of that archipelago (Gent. Herb. vi, fasc. ii, 1942) and find nothing to correspond with the Gaertner picture of *Euterpe globosa*, even though there may be similarities in Dictyosperma and Acanthophœnix. This Gaertner picture has not been matched so far in any part of the world other than its range in the western hemisphere. I have now examined great numbers of fruits and seeds of *E. globosa*, as we understand the species, and find the agreement sufficiently satisfactory even though not always perfect. Placement of the embryo is particularly convincing.

The generic name Euterpe was challenged by O. F. Cook in 1901 (Bull. Torr. Bot. Club), who discarded it as inapplicable to the western hemisphere palms and who proposed two names to take its place. One name is Catis, to which, as the only species, he refers *Euterpe oleracea* of Martius, but he gives no generic description other than to explain that the word has reference to

the drooping pinnæ, a feature common to pinnate palms; therefore the new genus cannot be adopted in nomenclature. The other name is Acrista, to which he refers a mountain palm of Puerto Rico (and which is *Euterpe globosa*) and Acrista must come up if Euterpe goes down. Cook is confused by the associated synonymy in the Gaertner account. He states also that Gaertner speaks of "an apical stigma" which the American palms do not possess; this is erroneous, for Gaertner records only an apical point, *cum brevi acumine ad apicem*, and says that the embryo is lateral. The point on the little fruit of our *E. globosa* is indeed typically lateral, yet its position is not constant and I have seen it essentially apical, as in Gaertner's picture.

I have regretted that the Gaertner name Euterpe was adopted and validated by Martius, and have had some sympathy with Cook's conclusion (see Gent. Herb. ii, 356, iv, 377). The adoption of Euterpe is inescapable in the present state of our knowledge, however, and to discard it would add much confusion to nomenclature without botanical gains. Yet this fact does not dispose of the question whether Euterpe as now constituted consists of two natural genera. The presence of clearly homogeneous albumen and completely ruminate albumen in a single genus raises the question; and there are two well marked modes of flower-bearing, one (as in *E. globosa*) in the scattered superficial series and the other sunken deeply in pits. Herbarium material is not yet sufficient to warrant publishable conclusions, for it does not show inflorescences, spathes, crownshaft, or very much of the leaf structure, and the habit of the tree is mostly unknown.

In determining application of the binomial *Euterpe globosa* we must first match fruiting specimens with the Gaertner picture; then we may rely on the judgment of critical modern writers who have explored the subject, as Beccari for Cuba in 1912 and Britton for Puerto Rico in 1923. We have not recognized the species on Trinidad or Tobago (see *E. tobagonis*). Grisebach does not mention it on any of the British West Indian islands. To this subject I hope still to return.

A later puzzle in Euterpe in relation to Trinidad and Tobago is *E. stenophylla*. I do not know that this binomial appears in print in respect to these islands but it is on old herbarium specimens apparently under the suggestion of Britton, and also in my official manuscript list of the palms as growing on Mt. Tucuche and Aripo savanna. *Euterpe stenophylla* is a listed name by Trail, 1884, without diagnosis or illustration and therefore under the Rules is not to be retained; but its history is interesting. The plant was originally listed as having been in cultivation in the Botanic Garden at Georgetown, Demerara in British Guiana, without nativity. I did not make any record of it as having been in that Botanic Garden in my visits there of many years ago. In later years I received specimens under this name from the Botanic Garden at Singapore, and supposing that exchanges had been made in previous years between Demerara and Straits Settlements I

applied to Georgetown for information, and now have complete specimens of it from there. In December, 1946, I again visited Demerara and in the Botanic Garden saw two trees of *E. stenophylla* at different places growing in water. It is a beautiful palm, but as there is no need of accounting for the name I shall not now make definition but only state that I have seen nothing to match it on Trinidad or Tobago.

Grisebach admits only one Euterpe on Trinidad. This is *E. oleracea*, Martius, the Assai of the Amazon and other parts of South America. This notable palm is not known on Trinidad, and it is difficult to make out what Grisebach had in mind. He makes the spadix-branches "furfuraceous-tomentose, whitish" which suggests *E. Broadwayæ*, although the "trunk 80–120 ft. high" does not correspond; nor can it be closely associated with *E. Langloisii*.

EUTERPE, Gaertn. Fruct. et Sem. Pl. i, 24 (1788).

Erect slender pinnate-leaved monœcious unarmed trees, dimorphous in respect to nature of albumen: pinnæ long and narrow, commonly hanging: inflorescence infrafoliar at base of short crownshaft; spathe duplex, the inner or commonly observed valve or sheath either glabrous or soon becoming so with denudation of a woolly covering; spadix usually simple, rachillæ rough sometimes with cavities in which the flowers sit, flowers in 3's of which the central one is pistillate with petals connate at base and the 2 lateral ones staminate and petals not connate at base; ovary 3-loculed; stamens 6, anthers versatile: fruit a small globoid body size of small or large pea, exterior firm or hard, indehiscent, hilum lateral, albumen either homogeneous or ruminate in different species.

A. Seed filled with plane undifferentiated homogeneous white albumen: flowers sunken in pits.

B. Branches of inflorescence nearly glabrous, less than 5 mm. thick when dry, white, drooping. . . . . 1. *E. Langloisii*

BB. Branches tomentose, more than 5 mm. thick when dry, brownish, stiff, divaricate. . . . . 2. *E. Broadwayæ*

AA. Seed with broken up or ruminate albumen, brownish from intrusions of the walls.

B. Flowers superficial (not sunken) on the rachilla, or depression, if any, without raised margin.

C. Rachillæ stout and undulate or crooked, the main axis 3–5 mm. thick when dry: flower-buds nearly or quite as thick as long, obtuse: trunk single. . . . . 3. *E. tobagonis*

CC. Rachillæ very slender, the main axis 2 mm. or less thick when dry, straight: flower-buds narrow and pointed: trunks several. . . 4. *E. pertenuis*

BB. Flowers sunken decidedly in cavities or pits on the rachilla.

C. Placement of flowers and fruits in loosely alternating pits separated by ridges: fruit dull black or brown: trunks several. . . . . 5. *E. Beardii*

CC. Placement of flowers and fruits congested side by side in spiralled or concentric pits not separated by ridges: fruit shiny black: trunk single. . . . . 6. *E. confertiflora*

For *Euterpe pubigera*, consult Prestoea, genus number 13.

1. **Euterpe Langloisii,** Burret, in Notizbl. Bot. Gart. Berlin, xiii, 34 (1936). Figs. 190, 191.

E. oleracea, Auth. not Martius.

Erect very slender tree to 16 m. plus tall with solitary trunk that 12–13 cm. thick at middle but perhaps several of them growing together, crownshaft 1.5 m. long: leaves spreading or horizontal and commonly drooping at end, to 2.5 m. in length; pinnæ very many, 60–70 or more pairs, hanging subopposite ly from a more or less scurfy rachis, very narrow, spaced 3–4 cm. apart, 1–2 cm. broad and 1 m. or so long, long-pointed, glabrous and unarmed throughout, somewhat glaucous-green: spathe infrafoliar, at base of crownshaft, 6–10 dm. long, at first erect but hanging after dehiscence, nude unless furfuraceous; spadix 6–8 dm. long, the many white slender long rachillæ spreading and drooping on release, apparently glabrous but covered with a very brief pubescence or tomentum, the flowers

190. Mature spadix, detached, of *Euterpe Langloisii,* with abundant fruit.

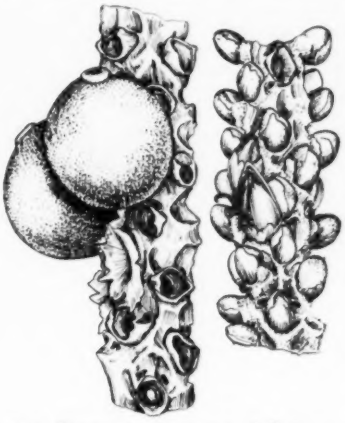
sunken in pits and when the pistillate flower falls 2 minute lateral scars show position of staminate flowers; blossoms white, projecting from the sharp-edged cup, anthers sagittate and dorsifixed on straight filaments: fruit obliquely globular, smooth, 1 cm. or trifle more diam. when dry, stigma prominent near apex, shell thin and separable, inner shell also separable and not shredded, calyx persistent; seed globose, brown, 6–8 mm. diam., albumen white, hard and solid, homogeneous.

Trinidad, apparently widespread: Cumuto Reservation, *Langlois;* Aripo savanna, *Broadway;* Long Stretch Reserve, *Beard, Bailey;* Southern Watershed Reserve, *Swabey.* Long known and supposed to be a South American species; first recognized as distinct by Burret from specimens collected in March 1935 at Cumuto by A. C. Langlois, who with his wife has developed a delightful planted Retreat at their home, Nassau, Bahamas.

2. **Euterpe Broadwayæ**, Becc. ex Broadway, in Palms of Tobago, Bull. Dept. Agr. Trinidad & Tobago, xv, pt. 5, 174 (1916), based on *Broadway 4745* from Tobago; Bailey, Gent. Herb. iv, 376 (1940). Figs. 192, 193.

   E. Broadwayana, Becc. in Fedde, Repert. xvi, 436 (1920), also based on *Broadway 4745*.

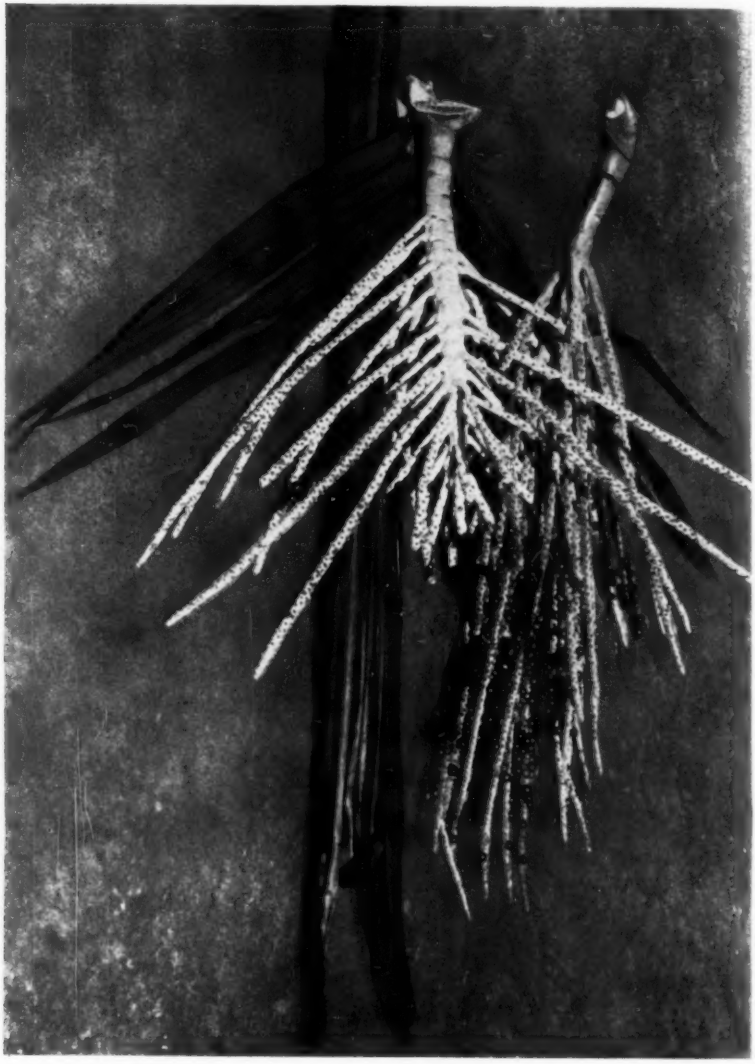
Stout tree to 16 m. tall, solitary or in clumps, boles like those of a young coconut 1 dm. thick, crownshaft 1.5 m. long: leaves evenly pinnate, about 16 to a coma or crown; pinnæ 80–100 subopposite pairs drooping from the more or less maculate rachis, glabrous unless scurfy on the midrib underneath but with a semi-glaucous look, 1 m. long, 2–4 cm. broad: main spathe woody, smooth and more or less glistening inside, many-nerved lengthwise, 1 m. long; spadix axis 4–5 dm. long, inflorescence simple, rachillæ stiff and divaricate, 6 dm. long at full growth, thick, brownish, densely covered with conspicuous tomentum; flowers sunken in pits, the staminates leaving small pits or "eyes" when they fall preceding the pistillates: fruit obliquely globular and bearing a conspicuous caducous point, 1 cm. thick, purple, the calyx-cup thin and prominent, exterior hard and uniform when dry, endocarp separate and entire; seed very hard, albumen white and homogeneous.



191. PIECES OF RACHILLÆ of *Euterpe Langloisii* × 2; fruits at left.

Tobago and Trinidad, on mountains. On Tobago in exposed and windswept places on Main Ridge, 1600–1900 feet, *J. S. Beard 122*, Pigeon Peak, *Bailey, 134, 136, W. G. Freeman & R. O. Williams 11380a* (collected 1925).

On Trinidad, Mt. Aripo, several trees together on top of mountain, *Broadway 9852* (collected 1922), *Swabey & Dean 13138;* on Mt. Tucuche, *R.A.K. 3136* (collected 1861), *Britton, Hazen, Mendelson 9741* (collected 1920).



192. EUTERPE BROADWAYÆ; foliage, spadices young and old, spathe in background.

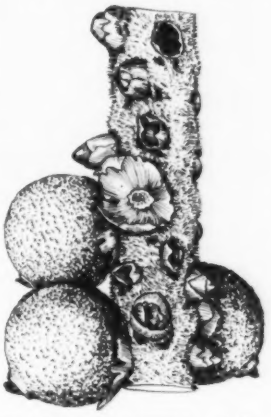
Seifriz 3 (collected 1939). The Trinidad occurrences require new study in comparison with the Tobago plants, to determine whether the differences are constant and also designative as to species. In the Tobago palm, which I have collected, I have not found a shredded endosperm or a loose exocarp such as I see in material from Mt. Tucuche, Trinidad.

Species named, at Broadway's request (*Broadwayæ*) for his daughter. This is probably the palm reported on Tobago by Broadway as *E. globosa*, Gaertn.

†3. **Euterpe tobagonis,** spec. nov. Fig. 194.

Arbor valida, alta ad 16 m., 2–6 dm. diam., coloniata sed truncus unicus, culmen superius deficiens: folia longo-pinnata, 3 m. longa; pinnæ circa 50 subopposita paria, rigidæ, non pendentes, 1 m. vel plus longæ, 2–7 cm. latæ, non glaucæ, valde costatæ subter: spatha 1 m. vel plus longa, glabra, levis, lignea; spadix multis simplicibus vel pæne simplicibus dense floralibus rachillis gracili apice; flores superficiales: fructus globulares, 13–15 mm. diam., purpurei, glabri, lobi calycis obtusi, hilum laterale, exocarpium tenue et fragile, endocarpium non divisum, rapha lateralis et conspicua; semen 10 mm. diam., valde ruminatum.

Erect stout single-stemmed palm to 16 m. tall, making forest colonies, bole 2–6 dm. thick, outer wood black and deeply fissured, crownshaft not evident: leaves evenly pinnate, 3 m. long, glabrous and unarmed; pinnæ about 50 subopposite pairs, stiff, mostly not hanging, 2–7 cm. broad, 1 m. plus long, strongly side-ribbed and midrib elevated, long-acuminate to apex: spathe 1 m. plus long, glabrous, 2–3 dm. broad at expansion, surface smooth but finely nerved lengthwise; spadix as long as spathe, many-branched, the branches or rachillæ simple or forked only from near the base, undulate, at first bright red on exposed surfaces otherwise whitish, densely floriferous but flowers superficial and not sunken in pits, the rachillæ stout and long-continued at end, staminate flowers 4–5 mm. long, petals strongly nerved, nearly obtuse: fruit globular, large for its relationship, purple at fresh maturity, 13–15 mm. diam., point at apex not developed, calyx-cup shallow and closely applied, lobes obtuse, hilum lateral, exocarp thin and brittle, endocarp longitudinally veined but not shredded, raphe conspicuous on nearly half of one side; seed large, 10 mm. thick, strongly ruminate with a solid white core.



193. PART OF RACHILLA of *Euterpe Broadwayæ*, with fruit. ×2.

Tobago: Roxborough, *Bailey 128*, Pigeon Peak, *Bailey 135* (type); Morne d'Or, *J. S. Beard 106; W. Seifriz 4*. Dr. Beard writes from his field observations that the species is abundant in the lower story of rain forests on the Main Ridge in Tobago, forming 20–30 per cent of the crop. It tends to occur gre-

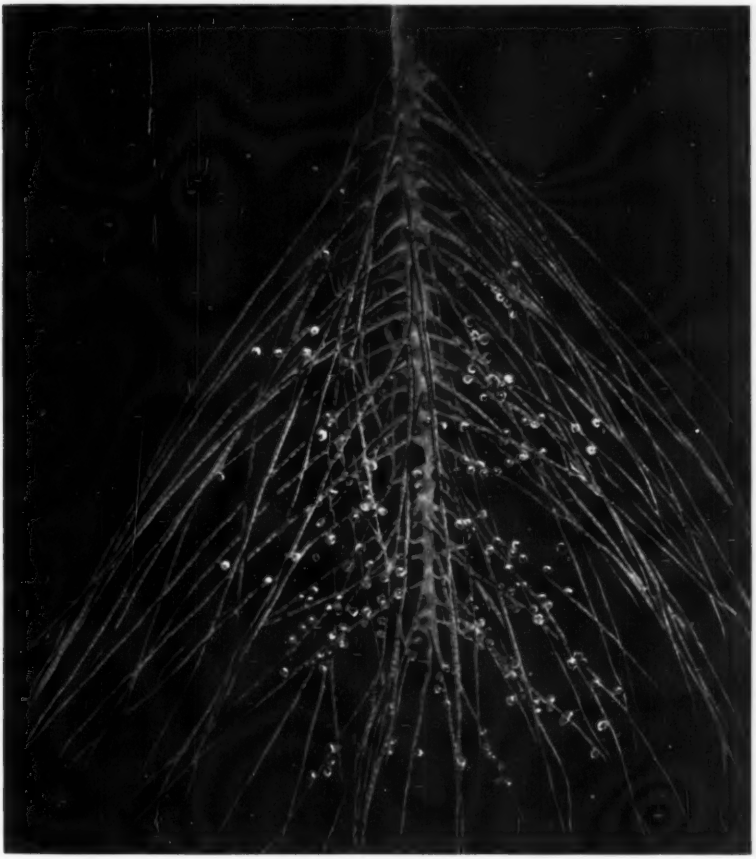
gariously in large patches, evidently having colonized gaps in the fores caused by wind. Altitudinal range 400–1600 feet; on ridge tops and exposed places replaced by *E. Broadwayæ*.

194. EUTERPE TOBAGONIS, showing pinnæ at left, spadix in flower, spathe.

The species differs from *E. globosa* of the more northerly islands (for which it has passed) in its strongly many-ribbed not glaucous under surface of leaves, pinnæ stiffer, rachillæ of spadix more slender and with longer very thin end, fruit larger, endocarp not loose or shredded, rumination of seeds more solid or continuous, forestal range at lower altitudes.

†4. **Euterpe pertenuis,** spec. nov. FORMALY. Figs. 195–196.

Valde gracilis, trunci multi, 12–15 m. alti: folia 1 m. vel plus longa, uniformiter et alterne pinnata, levia, glabra; pinnæ 40 vel plures in utroque latere, .75–1 m. longæ, pinnæ centrales brevi-attenuatæ, nervi laterales

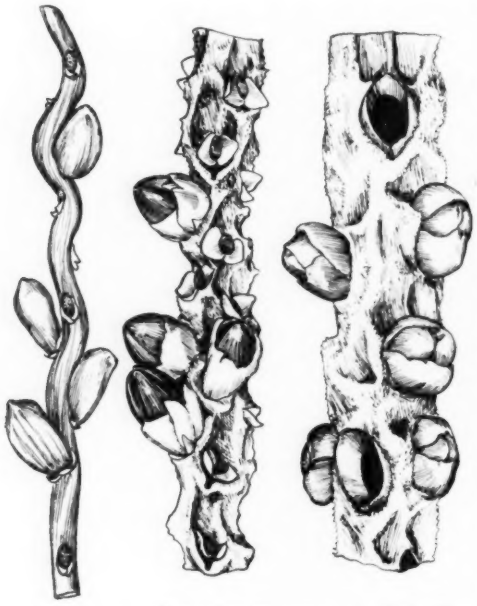


195. EUTERPE PERTENUIS, showing spadix with slender rachillæ and fruits.

multi validique: spatha 1 m. vel plus longa, levis; spadix simpliciter ramosa alba, rachillæ rectæ, valde graciles, 5 dm. longæ, 2 mm. vel minus crassæ glabræ; flores parvi, 2–3 mm. longi, acuti cum immaturi, superficiales dispersi: fructus (immaturi) globulares, circa 1 cm. diam., lobi calycis profundi obtusique, albumen ruminatum.

Slender tree of many trunks growing together, 12–15 m. high: leaves 1 m. plus long, uniformly alternately pinnate, smooth and glabrous; pinnæ 40 or more either side of glossy rachis, 3–5 cm. broad except those at apex and near the base, .75–1 m. long, those above the basal ones short-attenuate, somewhat lighter colored underneath but not glaucous, side-ribs many and strong: spathe above 1 m. long, smooth, scarcely ribbed longitudinally, long-pointed; spadix white, rachiliæ long and very slender, about 5 dm. long, 2 mm. or less thick at middle and above when dry, straight rather than wavy or crooked, glabrous; flowers small, scattered, superficial but in a slight not margined depression, 2–3 mm. long when dry, pointed in bud: fruit small (immature), globular, about 1 cm. diam., point not developed, calyx-cup deep and prominent, the broad lobes obtuse, hilum lateral, albumen ruminate, endocarp apparently not shredded.

Tobago: Roxborough, *Bailey 129*. Its slender dimensions, alternate pinnæ, very slender straight white rachillæ and shallow not margined floral depressions and sparsely placed flowers, sufficiently distinguish it until botanically better known.



196. RACHILLÆ OF THREE Euterpes × 4. Left, *E. pertenuis;* center, *E. Beardii;* right, *E. confertiflora.*

†5. **Euterpe Beardii,** spec. nov. FORMALY. Figs. 196–198.

Coloniata 8 m. alta, moderate valida, obscure annulata, culmen superius prominens: folia uniformiter pinnata, 1 m. vel plus longa, viridia, glabra; pinnæ oppositæ et subopositæ, nutantes, .75–1 m. longæ, 2–3 cm. latæ, longo-attenuata, nervi laterales longi: spatha pæne 1 m. longa, glabra, angusta, brunneo-chartacea; spadix simplex multis et ascendentibus rachillis glabris 6 dm. longis et 4–5 mm. crassis cum siccæ, fossæ alternæ et separatæ liris; flores pistillati partim in fossis submersi: fructus globosi, brunneoli vel nigri, 12 mm. diam; lobi calycis breves, erosi, obtusi; endocarpum divisum sed non anastomosum; albumen ruminatum.

Tree to 8 m. high, in clumps of 6–12, obscurely ringed not very slender boles, crownshaft prominent: leaves evenly pinnate, 1 m. plus long, glabrous and green throughout; pinnæ opposite and subopposite, gracefully hanging in numerous pairs, .75–1 m. long, 2–3 cm. broad, long-attenuate to narrow points, with few strong lateral nerves: spadix nearly 1 m. long, glabrous, chartaceous and brown, lightly longitudinally nerved, narrow, 6–8 cm. broad when unfolded; spadix simple, with many narrow ascending whitish glabrous rachillæ 6 dm. long, 4–5 mm. thick when dry, the pits or fossæ alternate and separated by little elevated lines or ridgelets, the pits thin and uprising; pistillate flowers broad and obtuse in bud, partly sunken in the pit: fruit globose, glossy, dull brown to black, about 12 mm. thick, point not developed, calyx small, the lobes erose and obtuse, endocarp continuous but at length somewhat shredded but not anastomose or patterned; albumen deeply ruminate from the sides, center white and solid.

Trinidad, in St. Patrick: Siparia Reserve in a swamp, *J. S. Beard 124;* in woods, Leasehold Reservation, *Bailey 122* (type), at Irois, *Bailey 185.*

†6. **Euterpe confertiflora,** spec. nov. Figs. 196, 199.

Arbor trunco unico ad 16 m. alta, culmen superius prominens: folia 1–2 m. longa, glauco-viridia, glabra, rachis acute angulata: pinnæ 40 et

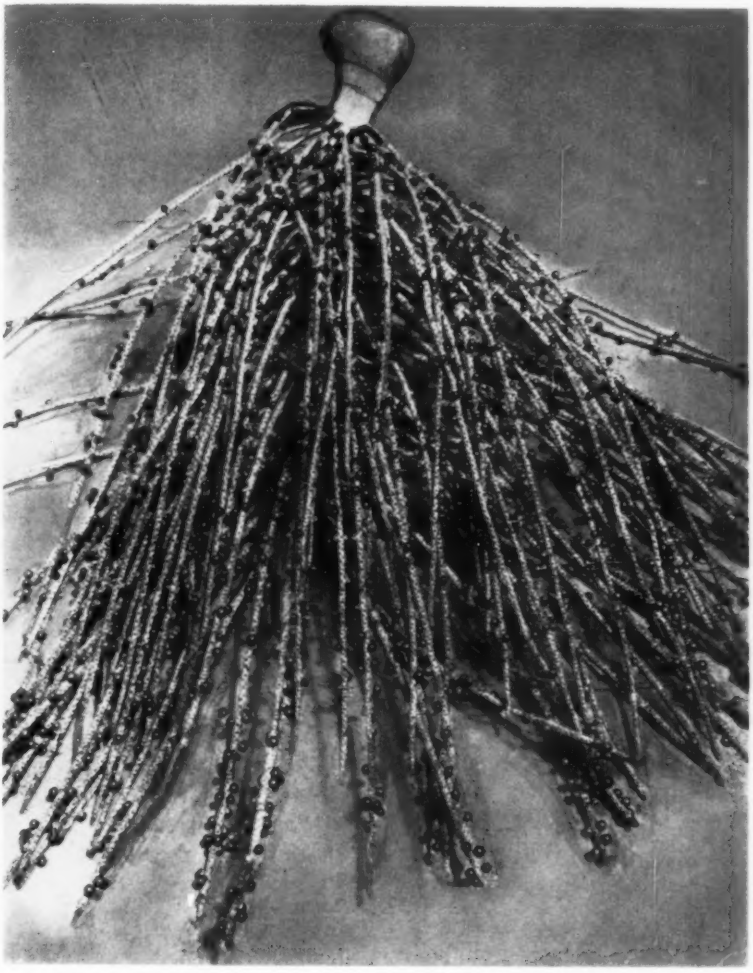
197. Coma or head of *Euterpe Beardii.*

paria, 1 m. plus longæ, 2.5 cm. vel minus latæ, nervi laterales pauci debilesque: spadix gravis, multis pæne vel admodum glabris rachillis 5–7 mm. crassis et .75–1 m. longis, ascendentibus divaricatisque, stricte floralibus; flores pistillati partim in fossis contiguis submersi: fructus cum immaturi globulares vel brevi-oblongi, 1 cm. vel plus diam., nigri, apex obliquus, calyx profundus lobis obtusis divisisque, endocarpium non divisum, semen ruminatum.

Tree with single trunk to 16 m. high, crownshaft prominent: leaves 1–2 m. long, pinnate, all parts glabrous; pinnæ 40 and more pairs, opposite or subalternate, about 3 cm. apart on the sharply angled rachis, 1 m. long, 2.5 cm. or less broad, bluish-green, midrib very prominent, lateral veins few and not strong: spadix heavy with many thick closely flowered ascending and divaricate rachillæ to 1 m. long and 5–7 mm. thick that are apparently glabrous but perhaps briefly tomentose on the axis itself; pistillate flowers broad and blunt in bud, partially sunken in margined contiguous pits or fossæ that are not separated by lines of elevated ridges: fruit (immature) glossy black, globular or short-oblong, apical point strongly oblique, 1 cm. plus long, calyx-cup deep and closely applied, the lobes blunt and frayed, endocarp not shredded or divided, albumen ruminate.

198. EUTERPE BEARDII brought out of the bush and photographed on a roadway; note the crownshaft above flowering parts.

Trinidad, in St. Patrick: by Leasehold Reservation, *Bailey 123.* Leaves less green and longer than in *E. Beardii.*



199. EUTERPE CONFERTIFLORA; spadix in fruit, removed from the tree.

11. ROYSTONEA—THE ROYAL PALMS

We come now to one of the most majestic of palms, the columnar Royal palm whose cement-like bole bears the great canopy of spreading and drooping leaves perhaps 100 feet in the air well above the outstanding brooms of flowers and fruits. From the earliest days these palms have been described by naturalists and travellers and names have been applied to them, yet we are at this moment in doubt as to the number of species and the proper botanical names of them. All this subject is now in the process of being adjusted again, and we are obliged to direct our attention only to the single Trinidad species.

The first botanical name meeting requirements of the Rules is *Areca oleracea*, Jacq. in 1763. Jacquin knew only one species, common in the Caribbean region, *vulgaris in Caribæis*. He published a striking picture of the tree, which we have assumed to be Barbadan; but the only means of real identification is his picture of the seeds, and these seeds are undoubtedly of the Trinidadian plant. All other problems of identification may now be held in abeyance.

In 1804 Karl Willdenow, who continued the work of Linnæus, founded the genus Oreodoxa ("glory of the mountains") for an occidental palm. The genus Areca, in which Jacquin named his *oleracea*, being oriental, Kunth in 1815 and Martius in 1837 took up Willdenow's Oreodoxa as the name of the lowland Royal palm of the West Indies. In Oreodoxa these palms remained until in 1900 when O. F. Cook founded for them the genus Roystonea, named in honor of General Roy Stone of the United States Army, long stationed in Puerto Rico. In Oreodoxa these palms stand in Grisebach's Flora of the British West Indian Islands in 1864.

ROYSTONEA, O. F. Cook, in Science, ser. II, xii, 479 (1900); Bull. Torr. Bot. Club, xxviii, 549 (1901).

Erect columnar monœcious unarmed trees, some of the species majestic in height and proportions, trunk single with inflorescence at its apex beyond which is a long crownshaft composed of overlapping petiole-bases and inclosing the great terminal bud and bearing the huge coma or crown of foliage: leaves horizontal, and the lower ones drooping, pinnate, the pinnæ overarching from the broad rachis and hanging: spathe woody or chartaceous, 1 m. and more long, ascending, long-tapering to a narrow point, of 2 sheaths the outer one of which soon falls and the inner one long-persisting and often hanging after its time is spent, dehiscing lengthwise along one side; spadix as long as spathe, comprising a central axis and many lateral simple or forked rachillæ that spread widely in anthesis; flowers superficial, unisexual, typically in 3's with the central one pistillate but often scattered, petals 3 and valvate, stamens mostly 6 and in pistillate flowers represented by a ring of scales: fruit single or only rarely double (1 or 2 carpels having aborted), an oblong or nearly globular small indehiscent body with more or less soft exterior, albumen ruminate.

200. ROYSTONEA OLERACEA in the wild; two men at bottom. Trinidad.

Roystonea oleracea, O. F. Cook, in Bull. Torr. Bot. Club, xxviii, 554 (1901). ROYAL PALM. PALMISTE. CABBAGE PALM. Fig. 200.

Areca oleracea, Jacq. Select. Stirp. Amer. Hist. i, 278 (1763).

Euterpe oleracea, Spreng. Syst. ii, 140 (1825).

Oreodoxa oleracea, Martius, Hist. Nat. Palm. iii, 166 (1837).

Stately tree to 35–40 m. high, bole single and straight, gray, usually enlarged at base and 4–6 dm. in diam., sometimes tumid at head high, then direct to flower-clusters at 25 m. and more above ground, green smooth crownshaft 2–5 m. high topped by a heavy coma or crown of widely spreading and commanding foliage, the head when tree is standing alone being nearly or quite horizontal on the base: leaves 3–7 m. long, often 2 m. broad; pinnæ 50 and more subopposite pairs, 1 m. plus long, 4–5 cm. broad with a few secondary ribs: spadix 1 m. and more long, white at first, simply or doubly branched, with glabrous or temporarily scurfy mostly undulate rachillæ 3–5 dm. long; staminate flowers about 6 mm. long; pistillate flowers

about 3 mm. long and typically placed between 2 staminates but this arrangement not constant: fruit oblong, purple to nearly black, glabrous, convex on one side and flat-concave on the other, 16–20 mm. long and 1 cm. thick, blunt at apex, tapering to small calyx at base, with somewhat soft exterior when mature and fresh, endocarp not separable; seed free in the endocarp, 13–15 mm. long, raphe fan-shaped and lateral at base, albumen white and homogeneous.

Trinidad, on intermediate lands and elevations, widespread. Much planted as a commanding grove and avenue tree on Trinidad and elsewhere; distinguished from other Roystoneas by the flat-bottomed coma, the straighter and less tumid bole, and particularly by the large oblong fruit. Statements that this mighty palm reaches 200 feet and more in height have not been verified by me. In 1922, in company with the late W. E. Broadway, I visited the Guayaguayare region in Mayaro when the government was cutting a roadway through a thick native forest of *R. oleracea* and measured the trees full length on the ground (see Gent. Herb. iii, 367–368). The tallest tree I measured was 110 feet over all, to the tip of the highest leaf. Perhaps on other lands on Trinidad the trees may reach a greater height.

"Palmiste real" (Royal palm) of the natives on Trinidad is *Jessenia oligocarpa*.

12. GEONOMA—ANARI PALMS

Two Geonomas are attributed to Trinidad. One of them is *G. vaga*, widespread on the island. Another is *G. oxycarpa*, yet unknown in Trinidad and probably only Hispaniolan (see Gent. Herb. iv, 260, 1939, with picture). It is not difficult to understand the assignment of *G. oxycarpa* to Trinidad because the native *G. vaga* is so variable in leaf form and venation, in size and branching of inflorescence, in size of fruit, as to make one question whether it is only a single species. I have a specimen collected at Chaguanas in 1879 with notation to the effect that it may be *G. oxycarpa*, primarily because it has only 3 pairs of leaflets.

Geonoma is itself a large and difficult occidental genus and one hesitates to assume responsibilities. Species now known from the Lesser Antilles are four (Gent. Herb. iv, 226).

GEONOMA, Willd. in Mém. Acad. Berlin, 1804, page 37; Sp. Pl. iv, 174 (1805).

Unarmed mostly monœcious palms of low or intermediate stature and mostly adapted to shade, often soboliferous, trunks (if any) usually slender and cane-like, devoid of crownshaft: leaves of pinnate pattern with con-

tinuous rachis but blade in many cases not divided and in others variously lobed: inflorescence infrafoliar or sometimes interfoliar from a small papery caducous spathe; spadix a straight single axis or a furcate cluster; flowers very small, partially sunken in pits or fossæ spiralled or alternate on the slender rachilla, ordinarily 1 pistillate between 2 staminates; stamens 6, filaments united, represented in the pistillate flower by a staminodium in the form of a toothed tube: fruit a little indehiscent single-seeded globose or ovoid pea-like body with homogeneous seed. Distribution mostly in South America, in woods.

201. GEONOMA VAGA; foliage, long hanging arms of fruit-clusters.

Geonoma vaga, Grisebach & Wendl., Fl. Brit. W. Ind. 517 (1864), typified on the Trinidad plant, with which the description corresponds. Fig. 201. *G. pinnatifrons*, Willd., var. *vaga*, Burret, in Engl. Bot. Jahrb. lxiii, 246 (1930).

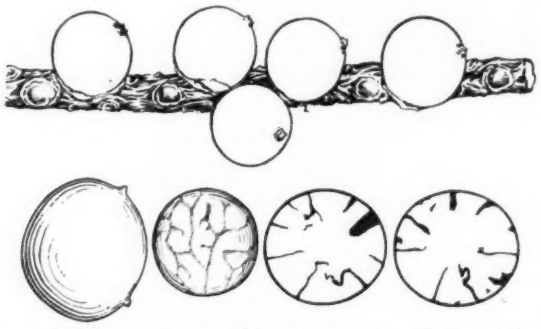
Small leafy tree 3–6 m. tall, stem 3–5 cm. thick, erect, obscurely ringed with petiole-scars: leaves clustered at apex, 1–2 m. long, ascending or upright, blade represented in divisions narrow or broad attached to rachis by base of equal width with the lobe rather than by petiole-like constriction, strongly many-ribbed, narrowed to a long thin apex, glabrous or minutely punctate underneath: spathe beneath the falling leaves and therefore infrafoliar, outer one 8–12 cm. long in four parts or valves and early

caducous, inner one to 30 cm. long and trough-like and later caducous; spadix becoming a slender hanging arm 5 dm. long with forking or branching rachillæ 4–20 cm. long and less than 5 mm. thick when dry, these rachillæ or branches minutely hairy-pubescent and bearing closely placed little bordered pits from which the flowers project conspicuously: fruit globular or short-oblong, 7–9 mm. long when dry, dull black, point very short, calyx usually not adhering; seed free, raphe prominent, albumen white and continuous.

Trinidad and Tobago, widespread in woods, variable; mountains and lower lands. Trinidad: Mt. Tucuche, *Wm. Seifriz;* Mt. Aripo, *Broadway 9851* (collected 1922); Morne Bleu, *W. G. Freeman & R. O. Williams 11556* (collected 1926), *Britton, Freeman, Bailey 2278* (collected 1921), *R. C. Marshall 12824* (collected 1933); Mt. Tamana, *W. G. Freeman 8964* (collected 1920), *Brittons & Hazen 9742* (collected 1920), *R. C. Marshall 12825* (collected 1933); Arima, *J. Dannouse* (collected 1903); Sangre Grande, *H. Prestoe 1004* (collected 1881); Chaguanas, *R. A. R. 1499* (collected 1879), *Broadway 3707* (collected 1889); Turure River District, *R. O. Williams 8653* (collected 1917); Valencia, *W. G. Freeman 8962* (collected 1920); Chatham, *J. H. Hart 6053* (collected 1896); Maracas Falls, *Broadway 5360* (collected 1893). Tobago: Main Ridge, *Beard 123;* Pigeon Hill, *W. G. Freeman & R. O. Williams 11374, Bailey 127;* Northern Range, *Beard 132*

13. PRESTOEA—PRESTOE PALM

In 1883 Sir J. D. Hooker separated *Hyospathe pubigera* of Grisebach's West Indian flora as a new genus, Prestoea, utilizing the name of Henry Prestoe who was Government Botanist and Superintendent of the Botanic Garden in Trinidad for the years 1864 to 1886. This separation has not been universally accepted, and Burrett in 1930 transferred the species to Eu-



202. PRESTOEA PUBIGERA, adapted from cuts in Gentes Herbarum iv, page 384. Above, fruits about natural size; bottom, fruits twice natural size.

terpe. Abundant specimens and field notes, however, clarify the situation and testify to the independence of the genus. Three species are now recognized outside Trinidad: *Prestoea montana*, Grenada; *P. Carderi*, Guatemala; *P. sejuncta*, Panama. (See Gent. Herb. iv, 382–385; vi, 201).

PRESTOEA, Hook. f. in Benth. & Hook. Gen. Pl. iii, 899 (1883).

Erect small unarmed trees without crownshaft, inflorescence interfoliar, leaves regularly pinnate, flower-cluster with axis continuing from base to apex and carrying divaricate thick-based rachillæ, pistillate flowers with convolute-imbricate petals, ovule basilar, fruit small and globular, albumen ruminate.

Prestoea pubigera, Nichols. Ill. Dict. Card. iii, 216 (1886). Fig. 202.
Hyospathe pubigera, Grisebach & Wendl., Fl. Brit. W. Ind. 516 (1864).
Prestoea trinitensis, Hook. f. in Bot. Mag. sub. t. 7108 (1890).
Euterpe pubigera, Burret, in Engl. Bot. Jahrb. lxiii, 53 (1930).

Slender tree 5–6 m. tall, crownshaft none, bole 3–4 cm. thick, broadly ringed 4–5 cm. apart: leaves 1 m. and more long, glabrous, green, unevenly pinnate, ribs of the parts of pinnæ about 1 cm. apart with one weaker rib between, the pinnæ or parts 1–16 cm. broad, tapered to a long slender point or sometimes 2-lobed at apex: spathe 4–5 dm. long, about 5 cm. broad, glabrous or with caducous flecks: spadix about 4 dm. long, essentially glabrous, branchlets or rachillæ 10–15 cm. long, tumid at base, strongly divaricate; flowers superficial, typically in 3's with central one pistillate, staminates white, 2–3 mm. long, with 6 stamens and a columnar pistillodium, pistillate flower smaller, all calyces minute: fruit globose, somewhat succulent, about 1 cm. thick when full grown and dry, hard, reddish to purple-black, exocarp thin and soon failing, endocarp more or less shredding, albumen invaded half way by many brown intrusions from the walls.

Trinidad, on northern mountains: Aripo, Tucuche, Blanchisseure road.

14. JESSENIA

Four species of Jessenia are known in South America and one on Trinidad. They are attractive and sometimes large pinnate-leaved monœcious trees separated from Œnocarpus by the greater number of stamens and ruminate albumen of the seed. The genus commemorates Dr. Carl Jessen, professor of botany at Eldena in Prussia.

JESSENIA, Karst. in Linnaea, xxviii, 387 (1856).

Erect stout trees with single trunk, without crownshaft, large shapely

coma of spreading and drooping pinnate leaves, spadices infrafoliar and large with many long hanging rachillæ: flowers unisexual, pistillates few at base or middle of rachilla, staminates many above them in irregular or spiral disposition, stamens 9–20; ovary 3-celled, stigmas 3: fruit an oblong drupe-like 1-seeded nut with hardening exocarp or shell, brief apical point, large calyx-cup with broad obtuse lobes, endocarp thin and shredded.

203. THE GRACEFUL COMA of *Jessenia oligocarpa*. Pinnate leaves of Bactris on both sides at base.

albumen cavernous in center and invaded on all sides by many long brown intrusions from the walls, embryo basal.

Jessenia oligocarpa, Grisebach & Wendl., Fl. Brit. W. Ind. 516 (1864). PALMA REAL of Trinidad. Figs. 203, 204.

Heavy tree with solitary thick trunk, to 16 m. tall, bole prominently ringed: leaves very long and large becoming horizontal, grooved petiole 1 m. long, pinnate blade 5 m. long and 3 m. broad, light green from the glaucous somewhat pubescent under surface; pinnæ many, alternate or subopposite from ribbed sides of thick rachis, 1.5 m. long with rather short perhaps bifurcate end, 2–8 cm. broad, stoutly many-nerved, lighter colored underneath and very shiny on upper face: spathe 1.5–2 m. long more or less, long-pointed, glabrous; spadix an elongated flattened and grooved axis from the lower surface and margin of which many glabrous rachillæ or branches depend; rachillæ 4–6 dm. long, nude on the lower slender tortuous part, few to several pistillate flowers succeeding, then flowers and a more or less sterile apex: fruit black, length with calyx about 3.5 cm., oblong, abruptly contracted to a brief columnar apex 1–2 mm. long, albumen with longitudinal central cavity but the solid part ruminate, 2–10 nuts ripening on each rachilla (whence *oligocarpa*, few fruits).

Trinidad, in forests on plains at southern base of northern mountains, as at Cumuto, Arena, Long Stretch, Valencia. A handsome palm with very large coma or head.

15. MAXIMILIANA—COCORITE

Strange deficiencies and inaccuracies have plagued the definition and nomenclature of the Cocorite, which is probably the commonest and most widely spread of the native palms of Trinidad.

Grisebach in his Flora of the British West Indian Islands apparently knew little about the palm itself. He does not describe the tree or the ripe fruit, nor does he state the number of stamens; he describes it from material taken on St. Kitts (St. Christopher) cited as in the Kew Museum (although this material appears not now to be in existence there) and on Trinidad collected by Crueger. In two visits to St. Kitts I have not seen this palm although I have looked for it, and Dr. J. S. Beard of the Forest Service in the British West Indies, who has made a detailed study on St. Kitts, assures me that the palm is not now on the island as a wild plant and probably not as a planted tree; and with our present knowledge of the palms and their geographies we should not expect a dominant species to be native both on Trinidad and the Leeward Islands; nor do we know the material accredited to Crueger. Perhaps Grisebach had material representing two similar but different palms, although we do not yet know a palm of such re-

lationship on St. Kitts; or there may have been confusion in the geography of the specimens. The original diagnosis of *M. caribæa* applies well to the Cocorite of Trinidad and this application was adopted by Prestoe, Harris and other authorities on the flora of Trinidad. I therefore let it rest without seeking further trouble.

In his review of Maximiliana in 1930 (Notizblatt, x, 691) Burret refers *M. caribæa* to *M. elegans*, Karst., of the Andean region of the Marañon River, headwaters of the Amazon system. I doubt the validity of this disposition, both on botanical and geographical grounds, and do not yet accept it.

Otto Kuntze in 1891 (Rev. Gen. Pl. ii, 728) proposed the generic name Englerophœnix to displace the palm genus Maximiliana of Martius, 1824, because of the Bixaceous genus of the same name by Martius in 1819. This case was considered by the appropriate committee of the first International Botanical Congress and the earlier generic name by Martius (1819)was displaced in the list of conserved and rejected names, published in 1906, in favor of Cochlospermum, Kunth, following Bentham and Hooker. Burret accepted this disposition in his treatment of 1930, and the palm genus Maximiliana is retained. This earlier Martian genus was not spelled Maximilliana, however; as published it had an extra syllable at the penult, Maximillianea (Flora ii, 451, 452, apud Schrank). The erroneous spelling is repeated in Bentham and Hooker in 1867 (Gen. Pl. i, 124) and in Index Kewensis, and elsewhere. The two names are not etymological variants and both are tenable, for they are not duplicates: "when the difference between two

204. GREAT SPADIX of *Jessenia oligocarpa* laid on a bench, some of the rachillæ fruiting.

names, especially two generic names, lies in the termination, these names are to be regarded as distinct even though differing by one letter only" (Art. 57, International Rules), as for example Peponia and Peponium. It is not necessary to bring up Cochlospermum to replace Maximilianea or to propose Englerophœnix to supplant Maximiliana. DeCandolle in 1873 (Prodr. xvii, 294), before the days of the present International Rules, brings up Cochlospermum for Maximilianea of Martius, 1819, because that name conflicts with Maximilianea, Martius 1824, thus reversing the error in spelling. Pfeiffer in 1874 (Nomenclator Botanicus) records other variants of the name. In 1889, however, before the International Rules had disposed of the question, Engler and Prantl in Die Natürlichen Pflanzenfamilien (ii, abt. 3, 81) had accepted Maximiliana, Martius, as the tenable name for the palm genus

205. Trees of Cocorite, *Maximiliana caribæa*, not yet in fruit; trunks covered with epiphytes.

and six years later (iii, abt. 6, 312) had adopted Maximilianea, Martius, for the Bixaceous genus. It might be assumed that these continuous misreadings were due to a supposition that the two generic names are only unimportant variants of a single noun, but the absence of any statement to that effect and the repeated misquotations preclude such an assumption and lead one to conclude that the case is a series of unintentional errors. The confusion, however, does not end here, for the origin of the names themselves is in dispute. Thus Pfeiffer and others state that the name is in compliment to Alexander Philipp Maximilian, Prince of Niewwied. Schrank in reporting Maximilianea in 1819 says it was named for the King; and Martius in founding his Maximiliana in 1824 (Nat. Hist. Palm. ii, 131) states that the name is for the illustrious King Joseph Maximilian I of Bavaria, who made the Brazilian journeys possible. Thus is the King, *Regis optimi, augustissimi*, twice commemorated, in the Bixaceous Brazilian shrub *Maximilianea regia* and the palmaceous Brazilian tree *Maximiliana regia*, by his grateful compatriot.

MAXIMILIANA, Martius, Hist. Nat. Palm. ii, 131 (1826).

Large and showy coarse unarmed monœcious or perhaps polygamo-diœcious pinnate-leaved trees, without crownshaft: inflorescence interfoliaceous; main spathe large and woody, persistent; spadix large and floriferous, the rachillæ bearing pistillate flowers on lower part and staminates above; staminate flowers with minute petals and 6 longer stamens; pistillate flowers much larger, ovary 3-loculed: fruit ovoid, hard, not very large, 1–2-seeded, with large persistent calyx, albumen homogeneous. Ten species now known, nine of them South American, some of them commanding trees.

Maximiliana caribæa, Grisebach & Wendl., Fl. Brit. W. Ind. 522 (1864). Figs. 205-207.

Englerophœnix caribæa, Kuntze, Rev. Gen. Pl. ii, 728 (1891).

Columnar tree often lofty to 25 m. but commonly seen on burnt-over and scrubby lands as a plant 7–12 m. tall with leaves arising from near the ground and the short trunk covered with leaf-bases and epiphytes as well as with thick shag, the long head or coma fan-shaped: leaves pinnate, 6–10 m. long, ascending with dead broken ones hanging to make an untidy looking subject particularly as the land also is likely to be covered with bush and weeds; rachis glossy, deeply furrowed on side in the groove of which the pinnæ are attached more or less in clusters or contiguously; pinnæ mostly horizontal or not drooping, 1–2 m. long, 2–6 cm. broad, thin, many-ribbed and strongly cross-veined, thin in texture, apex pointed or bifid: spathe erect from lower leaf-axils, woody and heavy, 2 m. long with an extended point or spike 5–6 dm. long, more or less caducously furfuraceous but otherwise glabrous, deeply and conspicuously furrowed lengthwise; spadix a continuous central shaft or axis from the sides of which arise many simple rachillæ 1–2 dm. long bearing pistillate flowers on the lower half

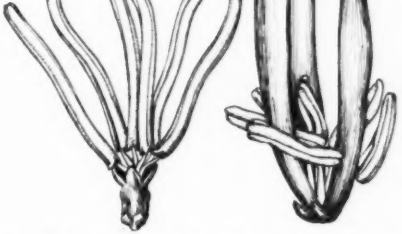
and fluffs of yellowish staminate flowers on the remainder, or some of the rachillæ all staminate; 6 anthers long and narrow, much exceeding the perianths: fruit torpedo-shaped, about 5 cm. long and 2 cm. thick, bearing a pronounced beak, somewhat curved, brownish or olivaceous in color, one-third to one-half contained in calyx-cup with its broad obtuse parts, exocarp chartaceous, endocarp thin and hardly separable; seed very hard, the slender homogeneous kernel lying lengthwise (often 2 kernels) and 2 cm. or more long, embryo at base (sometimes the center is cavernous and mealy, the work of an insect, and a beetle may be found therein).

Trinidad, widespread on poor sandy land, coming up and taking possession after fires and other destruction, a weedy and not attractive palm.

Unfortunately the nomenclature of the Cocorite cannot be verified: said by Grisebach to have been based on material in Kew Museum from St. Kitts and from Trinidad collected by Crueger. Original specimens of significant importance are unknown, as I have stated (although Burret speaks of having seen staminate parts collected by Crueger: Notizblatt, x, 692): and we now hesitate to assume that the same species is indigenous on both these islands. The fruit was not described by Grisebach, nor the tree itself. We must take the name for granted; and at last we have diagnosis of the species.

16. SCHEELEA

Occurrence of the difficult genus Scheelea on Trinidad-Tobago has been a subject of much doubt and difference of opinion. In 1929 Burret made definite contribution to the subject by founding *Scheelea Urbaniana* from two



206. TWO RELATED but very different flowers; × 3. Left, *Maximiliana caribæa* with 6 long stamens and very brief perianth lobes; right, *Scheelea curvifrons* with perianth parts of 3 stamen-like petals and 6 short stamens.

207. MATURE FRUIT of *Maximiliana caribæa*, natural size; note long beak.

collections by Broadway on Tobago. It has been supposed that the one in southern Trinidad is the same, a palm referred casually at various times to *S. osmantha* of Brazil and to *Attalea Cohune* of Honduras. We now make a further adventure into this confusion. The difficulty lies in collecting adequate material of these ponderous palms.

We must have staminate flowers in anthesis, because the generic differences lie largely in them at the same time that the flowers look much alike. Four genera are involved in the confusions and contrasts,—Attalea, Orbignya, Maximiliana, Scheelea. The two last are involved in the present studies. Recently it has been proposed to me that the four genera be combined, but there are other differences than floral characters to distinguish the groups; and if the four were combined we should still have the same problem before us inasmuch as classification does not alter the facts in nature.

208. UPRIGHT LEAVES of *Scheelea Urbaniana*.

In Maximiliana the anthers are 6, long and upstanding as if they were petals, the floral envelopes being minute at the base. In Scheelea the petals are 3, long upstanding and narrow as if they were anthers; the 6 stamens are small and short, in the center. These challenging structures are displayed in Fig. 206.

SCHEELEA, Karst. in Linnaea, xxviii, 264 (1856).

Heavy sometimes ponderous trees, monœcious or dioœcious, bearing great upright pinnate leaves and large woody main interfoliar spathes containing branching spadix of flowers and fruits: sepals of staminate flowers minute, petals 3, elongate, narrow and stamen-like, stamens 6, much shorter than petals and soon collapsing in the bottom; sepals and petals of pistillate flowers large, ovary 3-loculed with basal erect ovule: fruit ovoid or cartridge-shaped, hard and durable, covered with a thin husk that is fibrous inside and a bony nut with 1–3 seeds or at least cells, calyx remaining as a deep imbricated cup; albumen homogeneous. About 40 arboreous species in South America as far south as Paraguay, in West Indies, Central America and Mexico. Genus dedicated to Scheele, German chemist who lived and worked in Sweden.

A. Leaves erect; pinnæ divaricate, with extra rib near each margin: fruit obellipsoidal, mostly thickest above the middle and rounded to apex, rostrum with a flat disk-like base..... 1. *S. Urbaniana*

AA. Leaves arching and curved downward; pinnæ drooping from the rachis, lacking marginal ribs: fruit ellipsoidal, thickest at middle and tapered to apex, rostrum with a thick or bulbose base..... 2. *S. curvifrons*

1. **Scheelea Urbaniana,** Burret, in Notizbl. Bot. Gart. Berlin, x, 672 (1929). Figs. 208, 210.

Tree 10–13 m. high: leaves erect, 4 m. long, pinnæ mostly divaricate, not drooping unless the loose lower ones, petiole dark-lepidote on one or two of the angled faces; pinnæ 4 cm. or less broad, finely striate lengthwise and usually with a rather strong nerve-depression on either side near the margin showing on one face or the other, conspicuously cross-veined, apex not very deeply bifid: spathe 2 m. plus long; pistillate flowers close together on curves near base of rachilla: fruit obellipsoidal, about 6 cm. long including beak and 3 cm. plus broad just above the middle where it is usually thickest, dusky in color and finely striate, rostrum narrow and 4–6 mm. long above its thin sharp-edged disk-like base, calyx-cup 2–2.5 cm. deep, the lobes only indifferently if at all tapered to a point, innermost lobes not much exceeding the outer lobes; nut 1–2-seeded.

Tobago: at Easterfield, *Broadway 4015* (type), *Bailey 141*, Mason Hall, *Broadway 4744*. At one time this palm was supposed to be *Scheelea insignis* of South America.

†2. **Scheelea curvifrons,** spec. nov. TRASH PALM. Figs. 206, 209, 210.

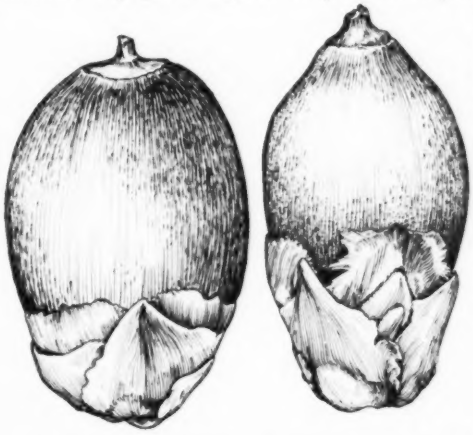
Alta arbor ad 12 vel 16 m., truncus unicus sed coloniatus: folia pinnata, 5 m. longa, glabra, rigida, albidiora subter; pinnæ glabræ, 1 m. vel plus

longæ, 3–5 cm. latæ, costa media prominens, nervi laterales obscuri, nerv transversi multi et conspicui: spatha maxima 2 m. vel plus longa, glabr lignea, profunde sulcata, rostrum planum et 2–4 dm. longum; spadi simplex, multis undulatis glabrisque rachillis lateralibus 5–7 dm. longis flores pistillati prope basin angulatam, flores staminati in superiore part dimidia, omnes superficiales; staminati 3 erectis angustis et antheriformibu petalis et 6 staminibus brevibus basi, calyx valde parvus: fructus ellipsoide 6–6.5 cm. longi, 3–3.5 cm. lati, rostrum 5–7 mm. altum, calyx 3 cm. altus partibus imbricatis latisque; endocarpium tenue, postea divisum; nux valde dura et indurata, 1–3 loculis.

Heavy stout upright tree, 12–16 m. tall, bole covered with hang and shag, ringed, 3–5 dm. diam.: leaves 5 m. long, erect-arching, recurving at end and making an attractive coma; petiole glabrous and glossy, only indifferently if at all lepidote on any margin, 5–6 cm. thick at middle, bearing pinnæ singly at intervals of 5–6 cm., flattened or expanded on both faces as well as on sides; pinnæ firm, hanging, 1 m. and more long, 3–5 cm. broad, midrib prominent but other longitudinal veins weak or not noticeable, cross-veins conspicuous, lighter colored underneath, margins not lepidote: main spathe 2 m. plus long, ligneous and deeply grooved, glabrous, beak flat, 2–4 dm. long; spadix simple with many lateral glabrous rachillæ 5–7 dm. long, undulate on lower part, some of them bearing pistillate flowers on the zigzag angles, none of the flowers sunken; staminates in clusters, cream-color, each with 3 upstanding anther-like petals 15 mm. long, very small calyx, 6 inconspicuous short stamens about one-fourth

209. RECURVED LEAVES of *Scheelea curvifrons*. In center at bottom, clump of *Bactris planifolia*.

length of petals: fruit ellipsoid or cartridge-shaped, 6–6.5 cm. long when dry, 3–3.5 cm. broad, tawny or brown, finely striate lengthwise, beak tapered with expanded thick base and 5–7 mm. high altogether, calyx-cup about 3 cm. deep in three series comprised of enlarged subtending bracts, intermediary parts tapered to prominent point, and longer very broad interior lobes with stout short point; exocarp thin, persistent; endocarp thin, adherent, becoming somewhat shreddy; nut very hard, thick, the locules 1–3.



210. NUTS OF TWO SCHEELEAS, natural size. Left, *S. Urbaniana;* right, *S. curvifrons.*

Trinidad, in St. Patrick, at Leasehold and Tllto, *Bailey 124, 183,* making dense forest-like stands, an attractive and conspicuous palm, trunks often covered with epiphytes; flowers in bloom exhale a strong turpentine odor.